

United States Patent

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[72] Inventors Hajime Horie; Tadao Hirano; Tokihide Suzuki, Fukuken, Japan 850,511
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[73] Assignee Fukui Seiren Kako Kabushiki Kaisha Koya Fukui-shi, Fukui-ken, Japan
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[31] 43/63721

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Primary Examiner—William I. Price
Assistant Examiner—Philip R. Coe
Attorney—Stevens, Davis, Miller and Mosher

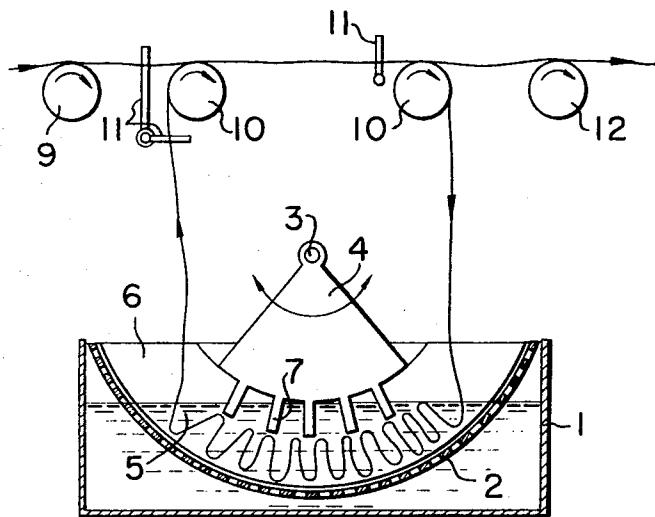
[54] DEVICE FOR TREATING TEXTILE FABRIC
1 Claim, 4 Drawing Figs.

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[51] Int. Cl..... B05c 3/134, B05c 3/136
[50] Field of Search..... 68/177, 176, 195, 153, 139, 53, 54

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ABSTRACT: A device for continuously treating a textile fabric, comprising a tank containing liquid therein, an arcuately curved, concave false bottom provided in said tank, a rotary frame pivotally mounted in said tank above said false bottom and having a curvature corresponding to that of said false bottom, means for alternately rotating said rotary frame in forward and backward directions like a pendulum, said rotary frame being provided on its peripheral surface with a plurality of partitioning plates each lying in a radial plane of said rotary frame to divide said peripheral surface into sections and a plurality of resistance plates each lying in an axial plane of said rotary frame to produce turbulent flow in the liquid above said false bottom during operation, whereby the textile fabric is successively passed through the respective sections and is subjected to breaking action by the turbulent flow of the liquid between the rotary frame and the false bottom.



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FIG. 1

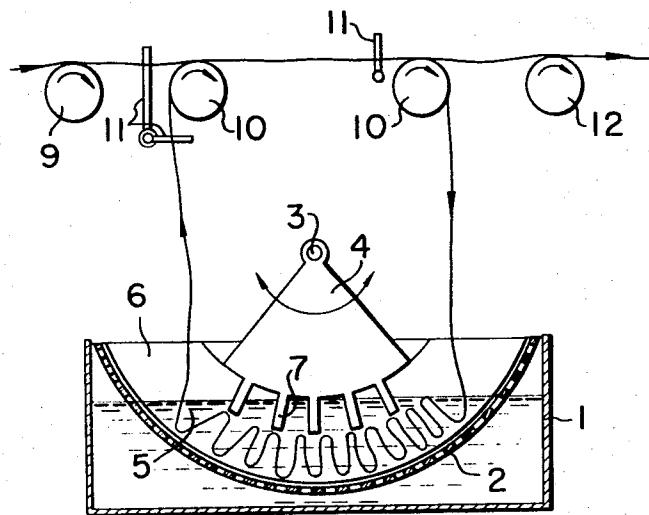
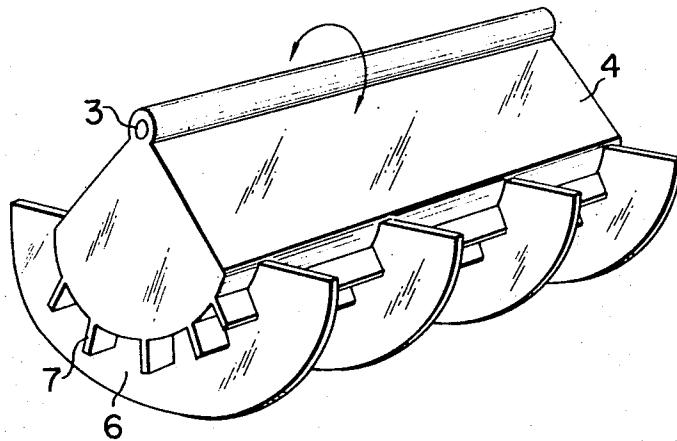


FIG. 2



INVENTORS
HAJIME HORIE
TADAO HIRANO
TOKIHIDE SUZUKI

BY *Stevens, Davis, Miller & Mosher*
ATTORNEYS

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FIG. 3

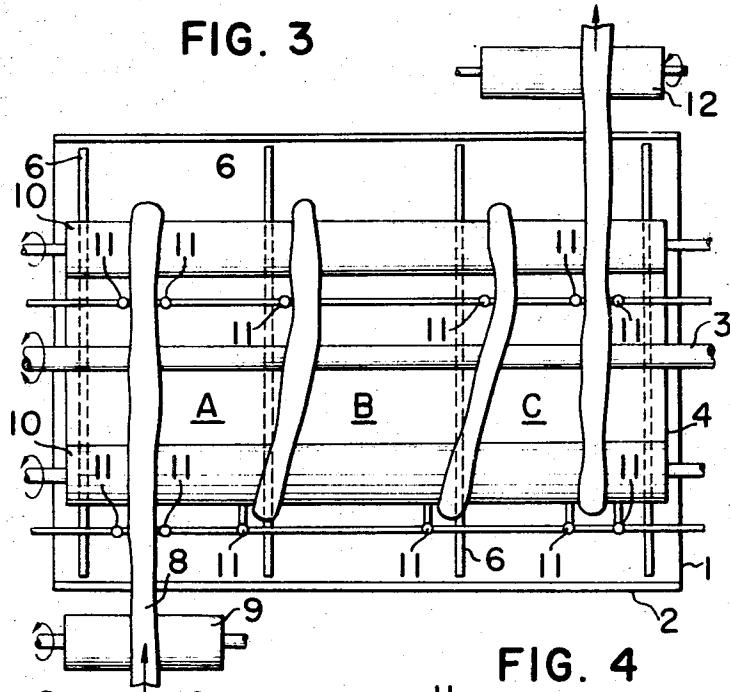
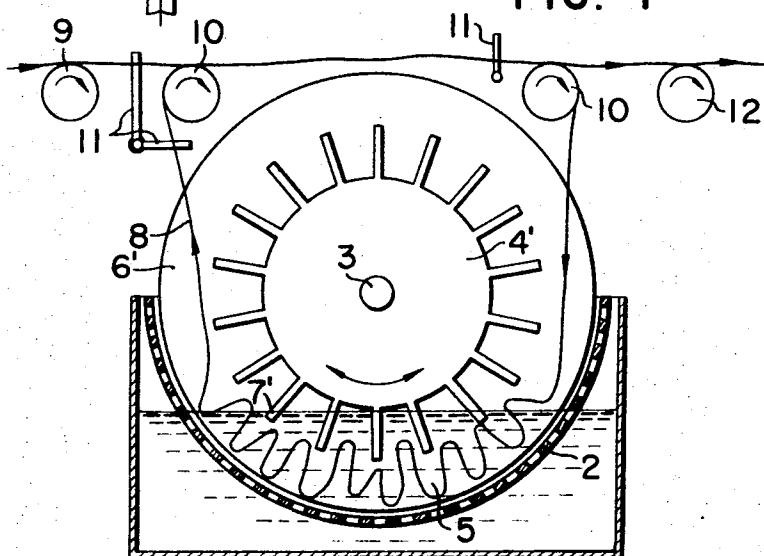


FIG. 4



INVENTORS
HAJIME HORIE
TADAO HIRANO
TOKIHIDE SUZUKI

BY *Stevens, Davis, Miller & Mosher*
ATTORNEYS

DEVICE FOR TREATING TEXTILE FABRIC

BACKGROUND OF THE INVENTION

The present invention relates to a wet treatment device for treating textile fabric continuously and effectively while giving strong breaking action thereto.

Such wet breaking treatment has been employed in several fields including craping of fabrics composed of highly twisted yarns of cellulosic fibers, rinsing and soaping of the fabrics after printing and steaming process.

Although the present invention can be generally applied to such treatment, the device according to the present invention is particularly effective to relaxing treatment of woven or knitted textured fabric of synthetic fibers.

The craping of the fabric made highly twisted yarns and the relaxing of the knitted or woven textured fabric of synthetic fibers can be performed by applying partial deformation to the yarns by the breaking action, such as caused by the bending, folding, or friction of the fabric, so as to promote the occurrence of the untwisting torque.

Heretofore, various device for applying such breaking action have been employed. Among of them a rotary washer is most effective, but it has such disadvantages that the operation is discontinuous and there is much inconvenience in operating the device at high temperature. Also there is a problem in uniformity of the treatment. For example, when the rotary washer is used to perform relaxing treatment of synthetic fibers, it requires complicated operations to compensate for the lack of uniformity in treating the textile fabric, such as, preparation of the textile fabric and examination of shape of the fabric which is being fed into the rotary washer.

Recently many types of continuous breaking device have been developed in order to overcome the disadvantages of the rotary washer, but the breaking method and apparatus heretofore proposed have disadvantages which restrict the use thereof.

Such disadvantages are enumerated as follows:

1. The breaking action is weak.
2. The breaking action lacks uniformity.
3. The textile fabric is subjected to substantial tension during the treatment.
4. The breaking operation can be hardly performed continuously for a prolonged period of time.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a device for breaking a textile fabric by which are avoided the above disadvantages and the fabric can be continuously treated.

It is a specific object of the present invention to provide a device for continuously treating textile fabric in which the uniform and strong breaking effect is given on the textile fabric in the form of a rope, by special turbulent flow of liquid, which apply strong and continuous breaking action on the textile fabric. Treating the fabric in the form of a rope avoids excessive tension on the fabric and enables to perform continuous treatment for a prolonged period of time.

In accordance with the present invention there is provided a device for continuously treating a textile fabric, comprising a tank containing liquid therein, an arcuately curved, concave false bottom provided in said tank, a rotary frame pivotally mounted in said tank above said false bottom and having a curvature corresponding to that of said false bottom, means for alternately rotating said rotary frame forward and backward like a pendulum, said rotary frame being provided on its peripheral surface with a plurality of partitioning plates each lying in a radial plane of said rotary frame to divide said peripheral surface into sections and a plurality of resistance plates each lying in an axial plane of said rotary frame to produce turbulent flow in the liquid above said arcuately curved false bottom during operation, whereby the textile fabric is successively passed through the respective sections and is subjected to breaking action by the turbulent flow of the liquid between the rotary frame and the false bottom.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings illustrate embodiments of the present invention, in which:

5 FIG. 1 is a sectional view showing the operation of the device according to the present invention;

FIG. 2 is a perspective view of a rotary frame;

FIG. 3 is a plan view showing the feed of the fabric in the device shown in FIG. 1; and

10 FIG. 4 is a sectional view showing the operation of a modified form of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, the device according to the present in-

15 vention comprises a tank 1, in which a perforated, arcuately curved false bottom 2 is mounted, with a suitable distance therefrom. As shown in FIGS. 1 and 2, a rotary frame 4 is mounted above said curved false bottom 2 so that it can pivot in forward and backward directions alternately, like a pendulum, about an axis 3. The rotary frame 4 is provided on its peripheral surface with a plurality of partitioning plates 6 and a plurality of resistance plates 7. The partitioning plates 6 lie in radial planes of the rotary frame to divide the peripheral surface into a plurality of sections A, B and C, while the resistance plates 7 lie in axial planes of the rotary frame. Thus the partitioning plates serve to partition the liquid above said false bottom 2, thereby preventing the fabric under treatment from swaying transversely with respect to the feeding direction thereof, while the resistance plates 7 serve to produce turbulent flow in the liquid in response to the pendulumlike forward and backward rotation of the rotary frame 4. The forward and backward rotation of the rotary frame produces complicated turbulent flow in the liquid existing in the upper portion 5 above the arcuately curved false bottom 2 in the tank, and by passing the fabric through such turbulent flow under no-tension condition, the turbulent flow gives strong and continuous bending action to the fabric, thus producing breaking effect.

20 40 In carrying out the breaking treatment of the fabric by the device according to the present invention, the water in the tank is maintained at suitable temperature, and suitable treating agent is added thereto, if desired. The fabric to be treated 8 is fed in the form of a rope through a supply roll 9, a fabric feeding roll 10, a guiding comb 11 into a first section A parti-

30 tioned by the partitioning plates 6, where the fabric is subjected to the breaking action in the area between the curved false bottom 2 and the resistance plates 7. After leaving the first section A, the fabric is fed through a second guiding comb 45 11 and a second feeding roll 10 into a second section B. Thus the fabric is successively subjected to the breaking action in the section B and section C, in the same manner as in the section A, and it is fed out of the device by a roller 12.

50 55 FIG. 4 shows a modified form of the breaking device, in which a rotary frame 4' of cylindrical form is mounted above an arcuately curved false bottom 2 and said rotary frame is provided on its whole peripheral surface with a plurality of annular partitioning plates 6' and a plurality of resistance plates 7'.

60 65 The rotary frame 4' is alternately rotated in the forward and backward directions, in the same manner as in the rotary frame as shown in FIGS. 1-3. However the rotary frame 4' of cylindrical form can be rotated to a slightly larger angle in the forward direction than in the backward direction, so that the fabric may be fed forward more easily and smoothly.

70 75 It will be apparent from the above description that the device according to the present invention can perform strong and uniform breaking operation, as required in craping, relaxing, rinsing or the like treatment, by the turbulent flow of liquid through which the fabric is passed, so that it can produce delicate and good products, without causing damages on the fibers.

I claim:

1. A device for continuously treating a textile fabric, comprising a tank containing liquid therein, an arcuately curved,

concave false bottom provided in said tank, a rotary frame pivotally mounted in said tank above said false bottom and having a curvature corresponding to that of said false bottom, means for alternately rotating said rotary frame forward and backward like a pendulum, said rotary frame being provided on its peripheral surface with a plurality of partitioning plates each lying in a radial plane of said rotary frame to divide said peripheral surface into sections and a plurality of resistance

5 plates each lying in an axial plane of said rotary frame to produce turbulent flow in the liquid above said arcuately curved false bottom during operation, whereby the textile fabric is successively passed through the respective sections and is subjected to breaking action by the turbulent flow of the liquid between the rotary frame and the false bottom.

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