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[54] **TEXTILE TREATMENT APPARATUS**

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[51] **Int. Cl.** **B05c 9/04**

[58] **Field of Search** ..... 68/44, 45, 205 R, 68/20

[56] **References Cited**

UNITED STATES PATENTS

1,803,968	5/1931	Heberlein	68/205 X
2,444,626	7/1948	Bixby	68/205 R
3,620,662	11/1971	Miyamoto	68/205 R
3,688,530	9/1972	Harris	68/205 R

FOREIGN PATENTS OR APPLICATIONS

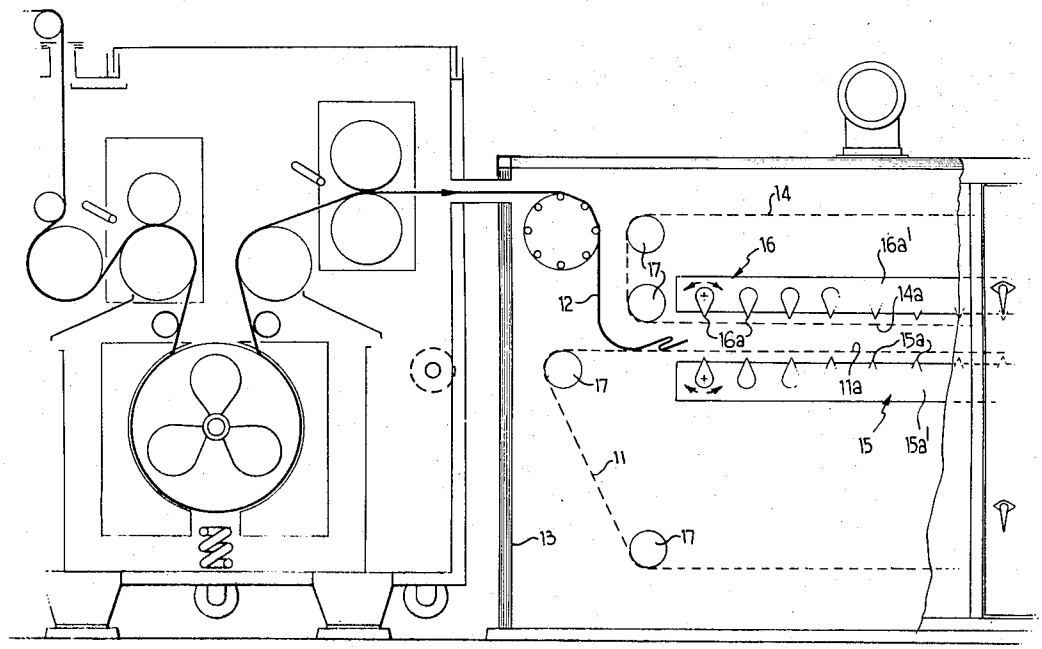
1,477,146	3/1967	France	68/44

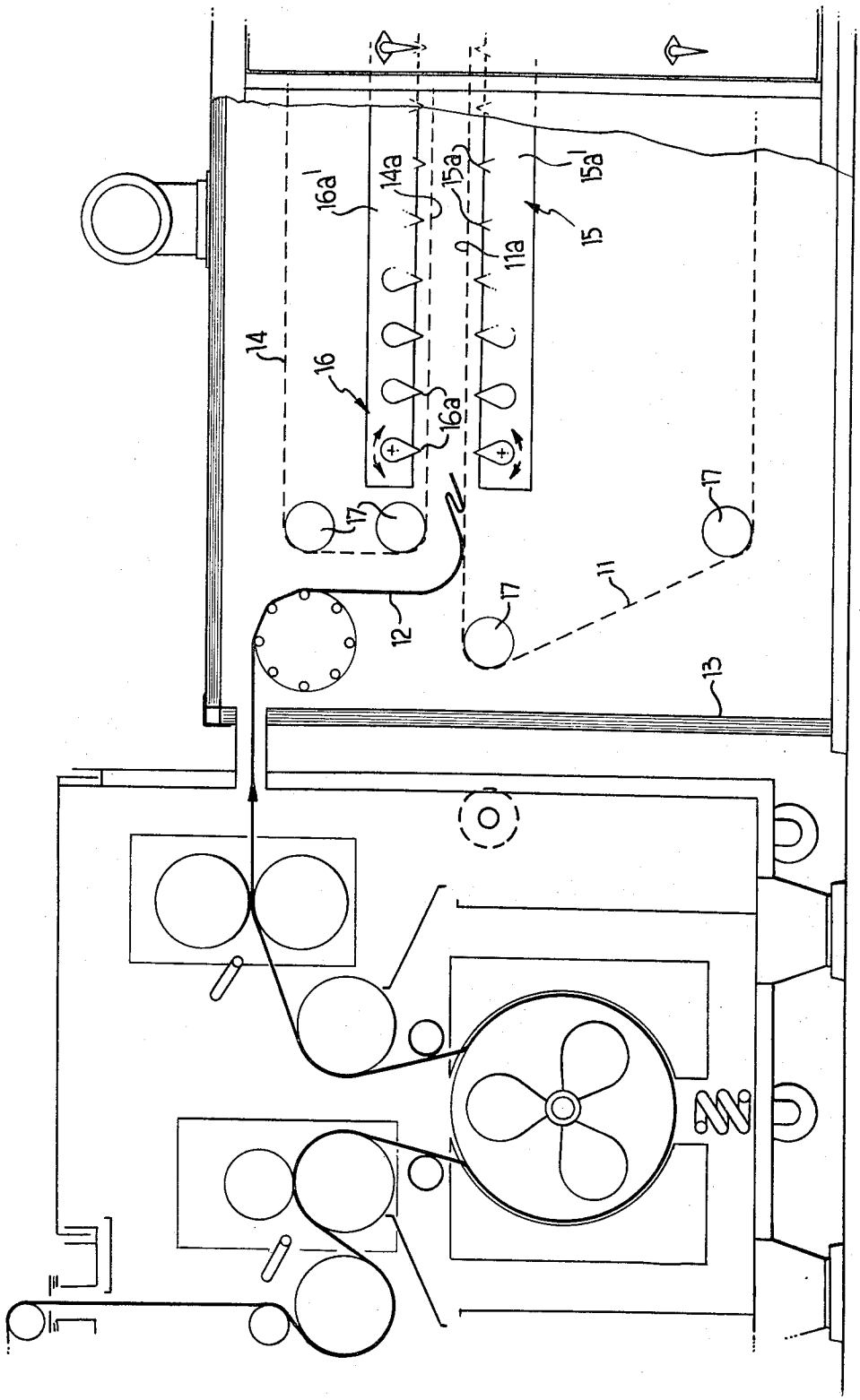
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[57] **ABSTRACT**

Apparatus for treating textile fabric in knitted or woven form for effecting relaxation thereof. An openwork conveyor structure supports and conveys the fabric under treatment. An abutment means of openwork construction is arranged in spaced opposed disposition relative to the conveyor structure. First and second treatment medium feed means are arranged in opposed disposition and are adapted to apply a treatment medium to the fabric. There is relative movement between the first and second treatment medium feed means in the feed direction of the conveyor structure to provide, at least periodically, oppositely directed displacement to the fabric at successive locations in the feed direction.

7 Claims, 1 Drawing Figure




16a'
14a
15a'
15a
15
11a
14
16
16a
17
12
11
13

TEXTILE TREATMENT APPARATUS

The invention concerns textile treatment apparatus and has more particular reference to apparatus primarily for use in the relaxation of fabrics comprising bulked yarns.

In order to effect relaxation of a woven or knitted fabric composed of bulked yarns it is necessary to subject such fabric to what can generally be referred to as a mechanical working operation, the fabric being subjected to a flexing operation whilst under conditions of little or substantially no tension.

The object of the present invention is to provide apparatus for effecting relaxation as aforesaid which will allow of the treatment of the fabric with air or with a fluid as required.

In its broadest aspect the invention provides, in or for a machine for the treatment of textile materials, opposed applicator nozzles or the like, (or sets thereof), arranged in spaced apart disposition for passage of a textile material therebetween, the said opposed nozzles, (or sets thereof), being adapted for relative movement in the intended feed direction of the material.

According to a preferred feature of the invention, the first and second treatment medium feed means each include a plurality of nozzle members arranged in spaced disposition and directed transversely of the fabric under treatment, the said nozzles being movably mounted for cyclic oscillation about respective axes spaced from outlets to the said nozzles and extending in the transverse direction of the fabric, the oscillation of the said first and second feed means being out of phase. Preferably, the oscilations of the first and second feed means are 180° out of phase. The abutment may comprise a mesh or like openwork structure movable in synchronism with the movement of the conveyor structure and in the same or opposite direction relative thereto.

According to another aspect of the invention apparatus for the treatment of a fabric comprises a support conveyor, an abutment means arranged in opposed disposition relative to the conveyor and first and second treatment medium feed means disposed behind a support surface of the support conveyor and an effective surface of the abutment means respectively for applying treatment medium to a fabric on the said support surface through such surfaces, the first and second such means being adapted to apply treatment medium to opposite sides of the fabric at successive spaced locations in the feed direction of the fabric.

The invention will now be described further, by way of example only, with reference to the accompanying drawing illustrating one embodiment thereof in side elevation.

Thus, referring now to the drawing, a textile treatment apparatus for the relaxing of fabrics comprising bulked yarns comprises an endless conveyor band **11** disposed within and adapted to move a fabric **12** under treatment longitudinally of a casing **13**, an abutment means defined by a further endless band **14** and having an effective surface **14***a* arranged in opposed spaced disposition relative to the support surface **11***a* of the conveyor band, a first treatment fluid feed means **15** disposed beneath the upper run of the conveyor band and having a plurality of nozzles **15***a* for directing treatment medium through the support surface to impinge on the fabric carried thereby, and a second treatment

fluid feed means **16** arranged above the lower run of the said further endless band and having a plurality of nozzles **16***a* for directing treatment medium through the effective surface **14***a* and onto the fabric.

The conveyor band **11** and endless band **14** are trained around suitable support rollers **17** for support thereby, one or more of the support rollers **17** of each band being driven thereby to advance the said band. Conveniently the bands **11, 14** are driven at the same linear speed and in such direction that there is no relative motion between the opposed support surface **11***a* and effective surface **14***a*. However, in some circumstances it may be found preferable to introduce a relative movement between surface **11***a*, **14***a*.

Both conveyor band **11** and endless band **14** are of open construction thereby to provide minimal restriction only to the passage of treatment medium therethrough.

The first and second treatment medium feed means **15, 16** are of a like kind, and thus only one will be referred to in detail, it being understood that such means will be arranged in opposed disposition at either side of the fabric being treated and each will supply medium to such fabric through the support surface **11***a* or effective surface **14***a;* as appropriate. Thus, each feed means comprises a plenum **15***a*, **16***a* connected with a supply of treatment medium through suitable ducting, not shown, and a plurality of nozzle members mounted in each such plenum for oscillating motion therein, the nozzle members extending from edge-to-edge of the fabric in the transverse direction thereof and having an elongate slot through which treatment medium is directed towards the fabric, treatment medium being fed to the nozzle members from the plenum by which such are mounted and a suitable sealing means being provided between the outer surface of the nozzle member and the underside (or upperside) of the plenum.

The nozzle members are arranged for oscillation about respective axes parallel to and spaced from the elongate nozzles, the nozzle members of the first feed means moving in like manner and in a direction opposite to those of the second feed means. Movement may be effected by cam or eccentrically controlled linkages.

In the apparatus illustrated the first and second feed means each include three plenums arranged in adjacent side-by-side disposition in the longitudinal direction of the fabric, although a greater or lesser number may be provided if necessary.

In use, a fabric under treatment is fed to the support surface of the conveyor band from a previous process step by any convenient means which gives an over feed in relation to the linear speed of the conveyor structure, and treatment medium, say a solvent, is applied to opposite sides of the fabric through the nozzle members of the first and second fabric feed means **15, 16**, such medium being drawn from within the casing by suitable fan means provided in the aforementioned ducting, which ducting further includes a heater coil or coils as required. The relative movement of the nozzle members of the first and second means causes the fabric, which fabric exists on the support surface of the conveyor in an intensioned or substantially intensioned state, to assume a ripple-like configuration for varying wave length and amplitude, the fabric being continually flexed by the fluid and being caused to contact the abutment means. It is thought that in moving from end-to-end of the conveyor the fabric allows a continually

changing arcuate path and that the flexing which results from moving in this manner, combined with the repeated contacts with the abutment means in a heated atmosphere, promotes relaxation of the fabric and an increased bulking thereof.

The solvent will be constantly recirculating and a proportion thereof will be fed to a recovery unit, all in accordance with conventional practice.

As an alternative to providing cyclically oscillating nozzle members through which the treatment medium is applied, the said members being mounted in fixed plenums, the plenums of the first and second treatment medium feed means may be arranged for relative movement in the feed direction of the fabric, the nozzle members being pivotally mounted or not relative to the respective plenums as preferred. Whilst generally the relative movement between the plenums is such that those of the first feeds means are moving oppositely to those of the second such means in that the movement of the two sets is 180° out of phase, if indeed both sets are moving, it may prove advantageous in some circumstances for the plenums of the two feed means to move in the same direction for part of the cycle.

In another arrangement, the nozzle members of one feed means are fixed in relation to those of the other such means but are arranged in offset disposition in the fabric feed direction.

In other arrangements the nozzles, instead of oscillating about an axis directed transversely of the fabric and arranged parallel to the plane thereof, are mounted for oscillation about an axis passing through the plane of the fabric, preferably perpendicular thereto.

Whilst the provision of nozzle members with elongate nozzles is convenient, the required jest of treatment fluid can be attained by providing through holes in a suitable feed pipe or tube, and the foregoing apparatus can be modified accordingly if desired. Thus, as a still further alternative, the nozzles may be replaced by apertured tubes or the like extending and movable in the longitudinal direction of the fabric, the tubes being arranged in side-by-side disposition in the longitudinal direction of the fabric.

The apparatus as herein disclosed may be used for the treatment of a fabric with air or a fluid and is of application at any convenient stage in the treatment of the fabric. As disclosed, the apparatus is intended for the solvent treatment of a knitted fabric whereby not only will the fabric be subjected to the solvent for cleaning purposes, but so to will the fabric be relaxed to improve the bulking thereof. The same or a similar apparatus may be used for, say, wetting out a knitted fabric whilst effecting relaxation thereof, for providing accelerated drying of a fabric, or in the scouring or dyeing of a fabric.

What we claim is:

1. In or for a machine for the treatment of textile materials, opposed application means arranged in spaced apart disposition for passage of a textile material therebetween, the said application means being adapted for relative motion therebetween in the intended feed direction of the textile material.

2. Apparatus for the treatment of textile fabric for effecting relaxation thereof comprising an openwork conveyor structure for supporting and conveying the fabric under treatment, an abutment means arranged in spaced opposed disposition relative to the support surface of the conveyor structure, the abutment means being of openwork construction, and first and second treatment medium feed means arranged in opposed disposition and adapted to apply a treatment medium to the fabric under treatment through the support surface of the conveyor structure and through the abutment means respectively, there being relative movement between the first and second treatment medium feed means, or parts thereof, in the feed direction of the conveyor structure to provide, at least periodically, oppositely directed displacement to the fabric at successive locations in the said feed direction thereof.

3. Apparatus as claimed in claim **2** wherein the first and second treatment medium feed means each include a plurality of nozzle members arranged in spaced disposition and directed transversely of the fabric under treatment, the said nozzles being movably mounted for cyclic oscillation about respective axes spaced from outlets to the said nozzles and extending in the transverse direction of the fabric, the oscillation of the said first and second feed means being out of phase.

4. Apparatus as claimed in claim **3** wherein the nozzle members of the first and second feed means are adapted to oscillate 180° out of phase.

5. Apparatus as claimed in claim **3** wherein the abutment comprises an openwork structure movable in synchronism with the movement of the conveyor structure.

6. Apparatus as claimed in claim **5** wherein the abutment is movable in synchronism with the movement of the conveyor structure and in the same direction thereas.

7. Apparatus for the treatment of a fabric comprising a support conveyor, an abutment means arranged in opposed disposition relative to the conveyor and first and second treatment medium feed means disposed behind a support surface of the support conveyor and an effective surface of the abutment means respectively for applying treatment medium to a fabric on the said support surface through such surfaces, the first and second such means being adapted to apply treatment medium to opposite sides of the fabric at successive spaced locations in the feed direction of the fabric.

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