

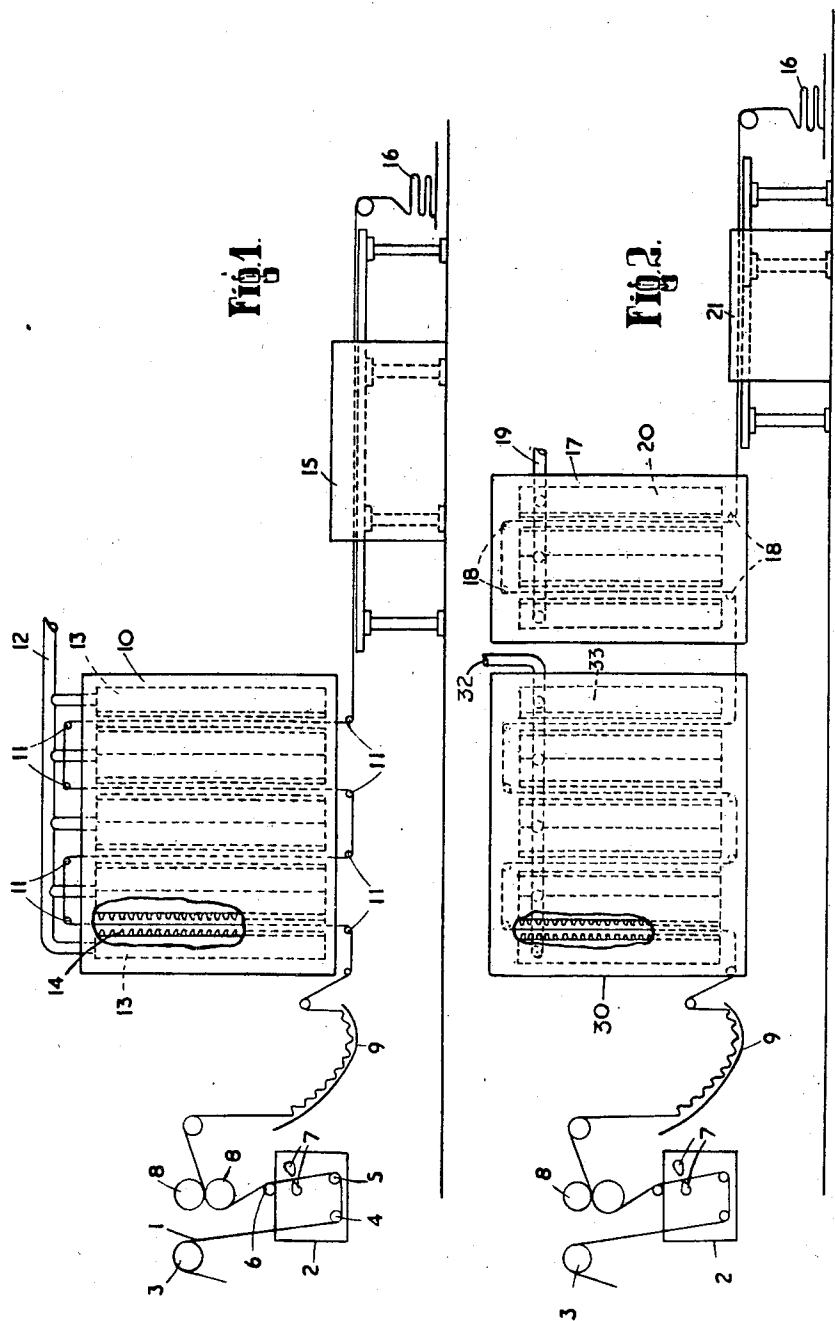
Feb. 5, 1952

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2,584,753

METHOD FOR TREATMENT OF TEXTILES

Filed March 25, 1949



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2,584,753

METHOD FOR TREATMENT OF TEXTILES

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Application March 25, 1949, Serial No. 83,496
In Great Britain December 5, 1947

2 Claims. (Cl. 26—18.5)

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The present invention relates to an improved method for the treatment of textiles.

Normally textile fabric during weaving and until the time it is finished, whilst undergoing desizing, scouring, washing, dyeing, drying and other processes, is subjected to warp tension, the partial or complete compensation of which, as upon a stentering machine, inevitably imposes severe strain on the fabric with loss of strength and possible damage.

An object of the present invention is to enable a fabric web after weaving to be treated by desizing, scouring, washing, dyeing, drying and other processes with substantial absence of warp tension.

In a method of treating webs of textile fabric according to the present invention subsequent to treatment with liquor, the web is partly dried substantially in the absence of weft and warp tension the drying of the web being completed thereafter under weft tension.

According to a further feature of the invention a method of treating webs of textile fabric consists in moistening the web by the application of steam thereto substantially in the absence of warp and weft tension and then drying said web simultaneously with the application of weft tension.

Strains which are imposed on fabric in stages of manufacture prior to finishing are normally relaxed during drying. The relaxation of such strains can be effected purely mechanically in a method such as is exemplified in the rubbing of material or working the material in such a manner that fibre is caused to move relative to fibre. Such a movement may be caused by agitating or scrubbing the fabric.

An alternative method of obtaining most effective shrinkage of the fabric and relaxation of strains comprises the rapid introduction of liquors into the texture of the fabric. The liquor may be directed in streams travelling with a high velocity from nozzles disposed either singly or in groups on one or on opposite sides of a fabric web which is traversing a given path past the nozzle or nozzles. The liquor is introduced at such an angle that it penetrates deeply into the interstices of the fabric web.

It will be preferred to pass the fabric web continuously from a desizing machine to a scray and from thence to a washing machine or a scouring, rinsing and washing machine wherein it is subject to impact on one or both sides by liquor streams, preferably directed on to the fabric web from nozzles disposed singly or in groups, the

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material then passing through squeeze rolls, whereupon it is either plaited up into a loose pile or passed to another scray. Thereafter the fabric web may be passed to a drying machine, or alternatively through a machine in which dye liquor is directed on to one or both sides of the continuously moving fabric web by nozzles, to another scray and thence to a drying machine. This drying machine may be of any known type through which fabric web can be conveyed with substantial absence of warp and weft tension, but preferably includes a plurality of guide rollers, certain of which can be driven, and of these some will be driven at a different speed to others to assist in relieving warp tension. The drying is preferably effected by hot air or gas streams directed at high velocity from nozzles or groups of nozzles disposed on one or opposite sides of the web.

The nozzles for impacting the streams of liquor, air or gas upon the fabric web are preferably such as will transform potential energy of fluid under pressure in a chamber to kinetic energy, and further the streams are preferably directed at an angle to the fabric web. Such streams may be directed either at an angle reversely to the direction of displacement of the fabric web relatively thereto or in the same direction, and a convenient arrangement will be one where groups of nozzles are disposed directed at differing angles so that there will be a tendency for the fabric web to be compressed longitudinally between separate groups of nozzles, thus minimising length tension.

Finally, drying and setting of the fabric may be effected by moistening the fabric with the application of steam and drying and setting it in a stenter. Owing to the fact that initial drying can be effected substantially in the absence of weft and warp tension it is possible to shrink fabric to such an extent that it can be subjected to steam and may be fed to a stenter at a width less than its finished stenter width. The fabric web may be fed into a stenter with a small amount of overfeed. In setting fabric the warp shrinks an amount compatible with the amount of overfeed such that no warp tension is introduced thereby and at the same time the fabric is pulled to width and set by the introduction of weft tension in the stenter.

The fabric is thus shrunk to such an extent that a final finish dimensionally stable to washing and laundering shrinkage is obtained without the necessity for any mechanical process causing compression of the wefts with longitudi-

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nal shrinkage or other similar subsequent shrinking processes.

The invention will be further described with reference to the accompanying drawings in which:

Fig. 1 is a diagrammatic representation of an apparatus embodying the present invention, and

Fig. 2 is a diagrammatic representation of a further form of apparatus embodying the present invention.

In the drawings like reference numerals indicate like parts.

Fabric web 1 is passed through liquor treatment vats 2 by means of feed and guide rollers 3, 4, 5 and 6. Liquor contained in the vat is directed under pressure by any suitable means not shown to nozzles 7 by which streams of liquor are directed on to the fabric web 1. Preferably the streams of liquor are directed on to the fabric web approximately at right angles and the resulting battering into the centre of the fabric web assists in producing shrinkage and relaxation of the strains. After the impingement of streams of liquor the fabric web is passed between squeeze rolls 8 and passed on to scray 9.

In the drawings there is only shown one liquor treatment vat but the invention is not limited to the provision of only one liquor treatment vat. It will be understood that in such cases this merely represents the last vat in a series which are adapted for example firstly for desizing, washing, scouring, dyeing and subsequent washing or other processes.

From the scray 9 the fabric web is fed into a drying machine 10 through which it is passed by means of the rollers 11. Heated air for drying is delivered by means not shown to conduit 12 and thence into pressure chambers 13, nozzles 14 disposed on opposite sides of the fabric web direct streams of heated air on to the fabric web from the pressure chambers 13. Certain or all of the rollers 11 are driven mechanically by a prime mover not shown and the speeds of rotation of the rollers are not all equal but differ in order to overfeed so as to assist in substantially reducing warp tension when in the drying machine.

After partial drying in the drying machine 10 the fabric web is passed for finishing and setting in stenter 15. The fabric web may be moistened in the initial stage of processing in the stenter 15 by the application of steam in a known manner. Thereafter it is dried and pulled to size with the application of weft tension. The fabric web is arranged to be overfed to the stenter so as to allow for warp shrinkage and substantially reduce the possibility of said shrinkage causing warp tension. After passing through the stenter the fabric web is plaited up into a loose pile 16 or otherwise collected in a known manner.

In the apparatus shown diagrammatically in Fig. 2 after being passed through liquor vat 2 and passed on to scray 9 as described in connection with the apparatus shown diagrammatically in Fig. 1, the fabric web is fed into the drying machine 30 in which it is completely dried. The maximum relaxation of strains in fibres is achieved by ensuring that the fabric web is completely dried. Heated air for drying is delivered, by means not shown, to conduit 32 and thence into pressure chambers 33 having nozzles similar to those of the construction of Fig. 1. Thereafter in order to set the fabric web it is necessary

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to moisten the fabric web and to apply heat thereto. Thus the fabric web is fed into a steamer 17 through which it is passed by means of rollers 18 and in which it is subjected to the application of steam in order to moisten the fabric web. Steam is delivered into conduit 19 from any suitable source not shown and thence to pressure chambers 20 from which it is directed by means of nozzles not shown on to opposite sides of the fabric web. As hereinbefore described with reference to the drying machine 30, the rollers 18 are driven from an external prime mover not shown at differing speeds so as to compensate for alteration in warp lengths and the lower rollers may be arranged to overfeed so as substantially to reduce warp tension.

After passing through steamer 17, fabric web is passed to a short range stenter 21 in which it is merely dried and set, there being no initial stage wherein steam is applied to the fabric web as in the stenter 15. The fabric web is effectively fully shrunk before it is passed to the stenter frame and consequently it is not normally necessary for the web to be overfed. Weft tension is applied to the fabric web in order to draw it out and set it to the required width. The web is stretched whilst in a plastic form at the entrance end of the stenter frame. One or more steam nozzles may be positioned at the entrance end in order to keep the fabric web hot and moist and prevent a drop in temperature. After the fabric web has been drawn out and set to the required width it is cooled as quickly as possible. When the fabric web comes into contact with normally cooled air any superfluous moisture is steamed off and in evaporating cools the fabric web. After passing through the stenter 21 the fabric web is either plaited up into a loose pile 16 or collected in any known manner.

The amount of moisture which is added to the fabric web by steaming is normally such as to raise the weight of the fabric web a little, for example, 1% or 2% above its final conditioned weight. If it is desired to add more moisture to the fabric web this may be achieved by applying steam to one side only of the fabric web and allowing the steam to condense by cooling the other side of the fabric web. Preferably the steam used in the steamer is circulated in an almost closed circuit, fresh steam being added in order to allow for loss of steam through entrance and exit openings in the steamer, and in order to maintain the required temperature and prevent excessive condensation.

The accompanying drawings are not in any sense limiting but are merely diagrammatic representations of two forms of apparatus embodying the present invention. For instance, the fabric web need not be passed vertically through a drying machine but may be passed through any known form of drying machine by which the fabric can be passed substantially in the absence of weft and warp tension. Similarly the application of hot air or steam to the fabric web by means of nozzles whilst being extremely beneficial and advantageous is preferable but not absolutely essential.

I claim:

1. A method of treating woven webs of textile fabric containing moisture, including performing three operations in sequence upon a web as it moves continuously forward, namely, an initial drying in the absence of warp and weft tension, then a moistening in the absence of

warp and weft tension, and then a drying under weft tension.

2. A method of treating woven webs of textile fabric, including performing four operations in sequence upon a web as it moves continuously forward, namely, a vigorous treatment of the continuously moving web with liquid, then an initial drying in the absence of warp and weft tension, then a moistening in the absence of warp and weft tension, and finally a drying under weft tension.

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