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APPARATUS FOR TREATMENT OF FABRICS

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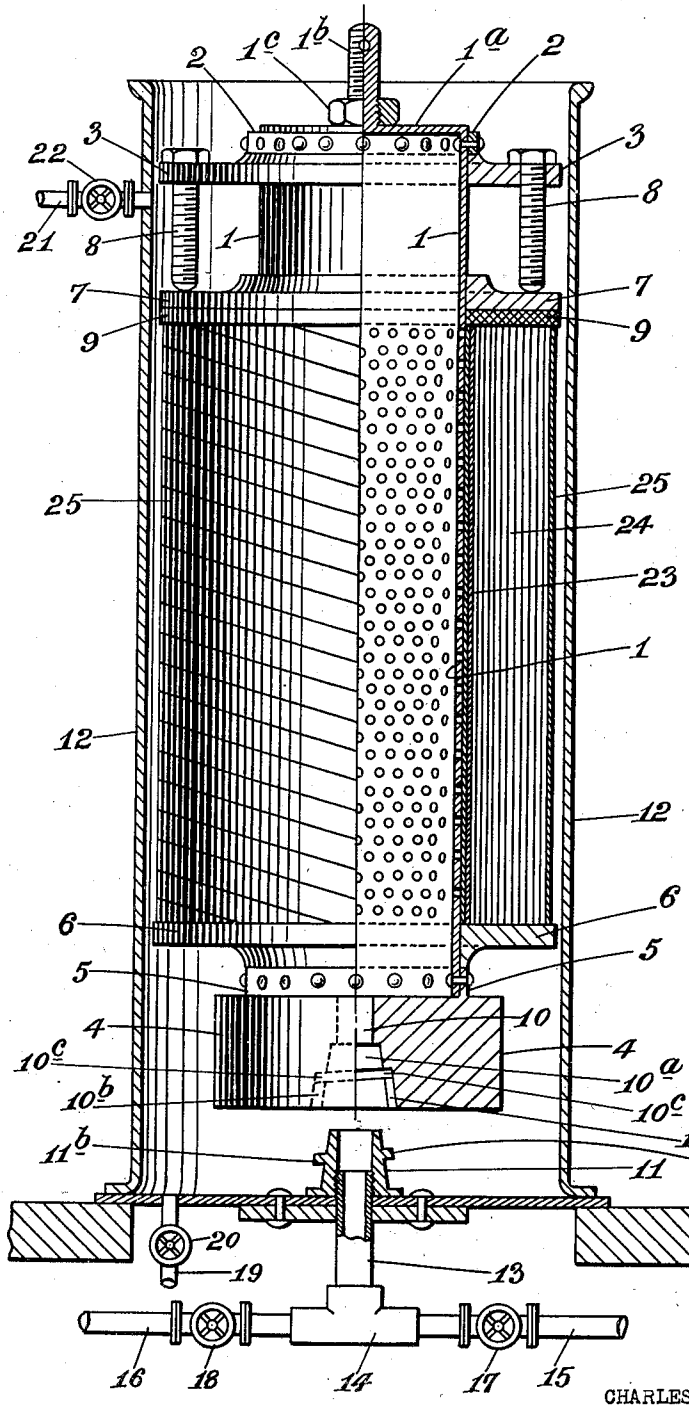

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APPARATUS FOR TREATMENT OF FABRICS.

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The invention relates to a process and apparatus for the treatment of woven or knitted fabrics, and especially fabrics consisting wholly or partly of cellulose acetate yarns, fibres or filaments, for the purpose of removing size, oil or other dressings therefrom.

In the manufacture of woven or knitted fabrics, especially those consisting wholly or partly of cellulose acetate, the operation of removing size, oil or other dressings from the fabrics, which is usually required in preparation for dyeing or other treatments is a difficult matter, whether in the dyebaths or other baths. The removal takes a long time, and moreover many sizes and dressings are not completely removed in this way, so that for example level dyeing of the fabrics is very difficult, and even for white fabrics the result may not be satisfactory.

It has now been found that sizes, oil or other dressings can be readily and efficiently removed from the fabrics by taking the fabric wound in a roll on a hollow perforated beam or pipe, and treating the rolled fabric thereon with a cleaning or scouring liquid caused to percolate outwards through the rolled fabric.

Any suitable liquid may be employed capable of dissolving or extracting the size, oil or other dressing; especially liquids such as benzene, xylene or other organic solvents may be used.

The liquid will be supplied to the perforated beam or pipe under any desired pressure. Conveniently only a low pressure is employed sufficient to overcome the resistance of the roll of fabric.

Uniform distribution of the cleaning or scouring liquid to all parts of the wound fabric may be assisted by allowing the liquid issuing through wall of the pipe or beam to pass first through a textile or other porous material before traversing the body of wound fabric to be cleaned or scoured.

If desired, especially at the first stage or portion of the treatment, the wound fabric on the beam or pipe may be allowed to soak in the cleaning or scouring liquid which has passed through it, before further cleaning or scouring liquid is passed through.

The perforated pipe or beam on which the fabric to be treated is to be wound is preferably covered with a porous material, for instance an absorbent or other textile material, which can act both as a filter for the cleaning or scouring liquid issuing through the holes or perforations, and also as a distributor to ensure uniform percolation of the liquid at all parts through the body of fabric wound on the pipe or beam.

The pipe or beam is provided at one end, or it may be at both ends, with an inlet adapted for connection to the supply of scouring or cleaning liquid. The fabric wound on the beam or pipe may be secured thereon by a spirally wound binding or otherwise.

Means are preferably provided in connection with the pipe or beam, for closing the ends of the roll of fabric wound thereon and ensuring that all liquid issuing through the holes or perforations of the pipe or beam shall be obliged to pass through the roll of fabric; for example, I may employ on the pipe or beam flanges or collars adapted to close the ends of the roll of fabric and one or both of which is or are adapted to be pressed endwise against the roll of fabric and held in position.

The beam or pipe carrying the roll of wound fabric is placed in a vessel; or a number of the pipes or beams may be placed in one vessel. Preferably the capacity of the vessel is such as only to leave a small space or clearance between its walls and the adjacent roll or rolls of wound fabric.

The beam or pipe or beams or pipes may be removably mounted in any convenient way in the vessel, vertically, horizontally or inclined, but preferably vertically, and is or are arranged to be connected to a supply pipe or pipes communicating with the supply of scouring or cleaning liquid. When the liquid is turned on to the beam or pipe or beams or pipes carrying the rolled fabric, the liquid percolates through the rolled fabric thereon and may be run off from the vessel or container continuously or otherwise as desired.

The following may be given as an illustration of the invention, it being understood that it is given only by way of example and can be varied widely without departing from the spirit of the invention.

The fabric to be treated, for instance a woven or knitted fabric composed of cellulose acetate yarn, is wound on a hollow perforated beam or pipe previously covered with an absorbent textile material or other porous material as before referred to, the beam or pipe having an inlet connection for the cleaning or scouring liquid at one end and being

closed at the other. The ends of the roll of fabric wound on the hollow beam or pipe are closed by deep flanges or collars on the beam or pipe, one or both of said flanges being slidably mounted thereon and adapted to be pressed endwise against the roll of fabric and to be held in position. The roll of fabric wound on the beam or pipe is secured by a spirally wound binding or in other convenient way.

The beam or pipe wound with the fabric is placed and supported in a vessel, preferably in a vertical position, the vessel being by preference just sufficiently large to contain it, with only a small clearance space between the wall of the vessel and the periphery of the fabric roll.

The inlet of the beam or pipe having been connected with the supply of cleaning or scouring liquid, which may be benzene, xylene or any other suitable liquid capable of dissolving or extracting the size, oil or dressing to be removed, the cleaning or scouring liquid is turned on to the beam or pipe. The liquid may be supplied to the beam or pipe under any desired pressure, but is preferably supplied under a low pressure, for instance of a slight static head, just about sufficient to overcome the resistance of the rolled fabric, as by this means short circuits of the liquid can be better avoided and the liquid better enabled to percolate equally to all parts of the roll of fabric. The liquid passing through the roll of fabric issues into the vessel which is provided with an overflow or an outlet pipe fitted with a cock, or with any other suitable outlet. The liquid may be allowed to flow continuously through the roll and from the vessel until the size, oil or other dressing is removed. Preferably however, when a certain quantity of cleaning or scouring liquid has passed through and immersed the roll of fabric in the vessel, the supply is shut off by a valve or the like and the roll is allowed to stand for a time in the liquid to soften the size or dressing, after which the dirty cleaning liquid is run off; fresh cleaning liquid is then admitted to the beam or pipe, preferably at a very slow rate and allowed to overflow or run off from the vessel, and the operation is continued uninterruptedly or intermittently until the size, oil or dressing is completely removed from the fabric. The perforated beam or pipe can then be removed from the vessel and the fabric may be unrolled for further treatment if required.

By means of the invention size, oil or other dressings can be very completely removed from the fabrics without mechanically damaging them in any way.

If desired the fabric may be dried partially or completely, while still on the perforated beam or pipe, by blowing air through the same and through the roll of fabric thereon by means of a suitable arrangement of pipes, or by centrifugal action. Such drying may be effected in the same vessel as that in which the removal of the size or dressing is performed, by providing this with the necessary air pipes and connections, or with means for rotating the pipe or beam carrying the roll of fabric; or such drying may be effected in separate apparatus adapted for the purpose.

Also, if desired, the fabric while still rolled on the pipe or beam, and dry or preferably partially dry, may be treated with dyeing, finishing or other desired liquids, supplied to the pipe or beam and similarly caused to percolate through the roll of fabric. Such treatments may be effected in the same vessel as that employed for the removal of the size or other dressings, or in separate vessels or apparatus if desired.

The accompanying drawing illustrates by way of example one form of apparatus for carrying out the invention, in which a perforated beam wound with a roll of the fabric, say cellulose acetate fabric, to be treated with cleaning or scouring liquid for removing size, oil or other dressing from the fabric, is placed in a containing vessel of such capacity as to leave a small space between its wall and the periphery of the fabric on the beam. The drawing shows the wound beam almost completely lowered into the vessel. The containing vessel is shown in vertical mid-section, and the wound beam is shown half in elevation and half in vertical mid-section.

The hollow tubular shell 1 constituting the body of the beam is perforated with small holes all over the portion on which the fabric is wound, and has a closed end 1^a at top (for example welded to it), which carries a screw-threaded stem 1^b with a nut 1^c thereon serving for turning the beam to couple it to the supply connection as mentioned below. On the body of the beam at the upper end a ring or collar 2 is riveted, and close under this is a flange 3 brazed on the tubular shell 1.

To the lower end of the tubular shell 1 of the beam a cylindrical end piece 4 is fixed by riveting an upstanding lug or shoulder 5 thereof to the bottom of the tubular shell. On the lower end of the tubular shell and butting on the shoulder 5 is brazed a deep flange 6. 7 is a deep flange slidingly mounted on the tubular shell 1 of the beam and adapted to be pressed tightly on to the top of the roll of fabric wound on the beam, by means of screw bolts 8, 8 screwing through the top flange 3, a soft pad of cotton or felt 9 being provided on the under side of the flange 7.

The end piece 4 is formed with a passage 10 opening into the interior of the shell 1 of the beam, the bottom of said passage being formed as a conical socket 10^a adapted to be connected to a corresponding male coupling piece 11 fixed, for instance by brazing, on

the bottom plate of the containing vessel 12, and connected to an admission pipe 13 which passes through the bottom plate of the vessel and screws into the male coupling piece 11, the socket 10^a and coupling piece 11 being adapted to engage together with a bayonet joint constituted by lateral slots 10^b and an annular groove 10^c formed in the wall of the socket 10^a, and by lateral projections 11^b formed on the member 11 and adapted to give passage to the slots 10^b in the descent of the beam, and to be engaged in the annular groove 10^c when the beam is given a partial turn. The admission pipe 13 is connected by a branch piece 14 to pipes 15 and 16 leading respectively to a supply of scouring liquid and a compressed air supply, and controlled respectively by cocks 17 and 18.

The vessel is fitted with a run-off pipe 19 controlled by a cock 20 and with an overflow pipe 21 controlled by a cock 22.

A few layers of absorbent cotton 23 are wound on to the tubular shell 1 over the perforated portion; the fabric 24 to be secured is then wound evenly on this, care being taken to keep the edges as level as possible, to facilitate making a tight joint with the flanges 5 and 7. The flange 7 with its pad 9 is then pressed tightly against the rolled fabric by turning the screw bolts 8. A spiral binding of thin fabric 25 is then wound tightly on the roll of fabric and the beam is lowered into the vessel 12 and connected to the coupling piece 11 by the engagement of the socket portion 10^a of the passage 10 therewith and by partly turning the beam by means of the nut 1^c so as to engage the bayonet joint of the coupling. The interior of the tubular shell 1 is thus connected with the admission pipe 13.

The vessel is now filled with the scouring liquid (e. g. benzene, xylene or other organic solvent of the size, oil or other dressing to be removed from the fabric) by opening the cock 17, the scouring liquid passing up through the shell 1 of the beam and percolating through the perforations thereof, through the layers of absorbent cotton fabric 23 and through the roll of fabric 24 to be treated and the outer spiral binding 25. When the vessel is filled, the supply of scouring liquid is shut off and the liquid is allowed to remain until such time as the size or dressing has been found by experience to be dissolved, after which the scouring liquid is drained off by the cock 20. Fresh scouring liquid is now turned on by the cock 17 under slight pressure about sufficient to overcome the resistance of the fabric, and is allowed to percolate slowly through the roll of fabric, rise in the vessel and overflow by the pipe 21, the cock 22 being opened. The percolation is allowed to continue with overflow at the pipe 21 until the outgoing liquor is practically free from the size, oil or other dressing; the supply of liquid is then cut off and the vessel again drained by opening the cock 20. After draining the vessel, the fabric may be dried by blowing compressed air through the beam by turning on the cock 18 of the compressed air supply pipe 16. When the fabric is dry the beam may be disconnected from the coupling and lifted out of the vessel, and the fabric be unwound for dyeing or other treatment as required.

If desired, the roll of fabric on the beam, before the drying in the vessel as mentioned, may be treated with soap solution in an exactly similar manner to that employed for the scouring liquid, by providing a suitable cock-controlled supply pipe (not shown) connected to the admission pipe 13 and another cock-controlled overflow similar to that shown in the drawing.

The invention permits of cheaply and rapidly eliminating weaving or other sizes or dressings from fabrics and especially fabrics consisting wholly or partly of cellulose acetate.

What I claim and desire to secure by Letters Patent is:—

1. Apparatus for removing dressings from fabrics, comprising a hollow perforated cylindrical member on which the fabric to be treated is wound in the form of a roll, said hollow perforated cylindrical member having an inlet for admitting scouring liquid to its interior; and flanges on the perforated cylindrical member and adapted to close the ends of the roll of fabric thereon, at least one of said flanges being slidable on the cylindrical member and adapted to be pressed endwise against the roll of fabric and held in position, and a pad of soft material interposed between the adjustable flange and the end of the fabric roll.

2. Apparatus for removing dressings from fabrics, comprising a hollow perforated cylidrical member on which the fabric to be treated is wound in the form of a roll, said hollow perforated cylindrical member having an inlet for admitting the scouring liquid to its interior; a layer of porous material closely surrounding the perforated cylindrical member and adapted to assist uniform distribution of the scouring liquid to the roll of fabric; and flanges on the perforated cylindrical member and adapted to close the ends of the roll of fabric thereon, at least one of said flanges being slidable on the cylindrical member and adapted to be pressed endwise against the roll of fabric and held in position.

3. Apparatus for removing dressings from fabrics, comprising a hollow perforated cylindrical member on which the fabric to be treated is wound in the form of a roll, said hollow perforated cylindrical member having an inlet for admitting the scouring liquid to its interior; flanges on the perforated cy-

lindrical member and adapted to close the ends of the roll of fabric thereon, at least one of said flanges being slidable on the cylindrical member and adapted to be pressed endwise against the roll of fabric and held in position; a pad of soft material interposed between the adjustable flange and the end of the fabric roll; a containing vessel having a supply conduit for the scouring liquid and overflow means for the spent liquid; and means for detachably connecting the inlet of the perforated cylindrical member to the supply conduit when the cylindrical member is placed in position in the containing vessel.

4. Apparatus for removing dressings from fabrics, comprising a hollow perforated cylindrical member on which the fabric to be trated is wound in the form of a roll, said hollow perforated cylindrical member having an inlet for admitting scouring liquid to its interior; a layer of porous material closely surrounding the perforated cylindrical member and adapted to assist uniform distribution of the scouring liquid to the roll of fabric; flanges on the perforated cylindrical member and adapted to close the ends of the roll of fabric thereon, at least one of said flanges being slidable on the cylindrical member and adapted to be pressed endwise against the roll of fabric and held in position; a containing vessel having a supply conduit for the scouring liquid; and means for detachably connecting the inlet of the perforated cylindrical member to the supply conduit when the cylindrical member is placed in position in the containing vessel.

5. Apparatus for removing dressings from fabrics, comprising a containing vessel; a hollow perforated cylindrical member on which the fabric to be treated is wound in the form of a roll, said hollow perforated cylindrical member being closed at its upper end and having an inlet for scouring liquid at its lower end, and adapted to be arranged vertically in the containing vessel; flanges on the perforated cylindrical member and adapted to close the ends of the roll of fabric thereon, at least one of said flanges being slidable on the cylindrical member and adapted to be pressed endwise against the roll of fabric and held in position; a pad of soft material interposed between the adjustable flange and the end of the fabric roll; a supply conduit for the scouring liquid and overflow means for spent liquid; and means for detachably connecting the inlet of the perforated cylindrical member to the supply conduit when the cylindrical member is placed vertically in position in the vessel.

6. Apparatus for removing dressings from fabrics, comprising a hollow perforated cylindrical member on which the fabric to be treated is wound in the form of a roll, said hollow perforated cylindrical member having an inlet for admitting scouring liquid to its interior; flanges on the perforated cylindrical member and adapted to close the ends of the roll of fabric thereon, at least one of said flanges being slidable on the cylindrical member and adapted to be pressed endwise against the roll of fabric and held in position; a pad of soft material interposed between the adjustable flange and the end of the fabric roll; a supply conduit for the scouring liquid and overflow means for the spent liquid; means for detachably connecting the inlet of the perforated cylindrical member to the supply conduit when the cylindrical member is placed in position in the containing vessel; and a compressed air pipe adapted to be put into and out of communication with the inlet of the perforated cylindrical member while this is in position in the vessel, for the purpose of blowing air through the roll of fabric.

7. Apparatus for removing dressings from fabrics, comprising a containing vessel; a hollow perforated cylindrical member on which the fabric to be treated is wound in the form of a roll, said hollow perforated cylindrical member being closed at its upper end and having an inlet for scouring liquid at its lower end, and adapted to be arranged vertically in the containing vessel; flanges on the perforated cylindrical member and adapted to close the ends of the roll of fabric thereon, at least one of said flanges being slidable on the cylindrical member and adapted to be pressed endwise against the roll of fabric and held in position; a pad of soft material interposed between the adjustable flange and the end of the fabric roll; a supply conduit for the scouring liquid and an overflow pipe for the spent liquid; means for detachably connecting the inlet of the perforated cylindrical member to the supply conduit when the cylindrical member is placed vertically in position in the containing vessel; means for controlling the liquid supply to the inlet of the perforated cylindrical member; and a compressed air pipe adapted to be put into and out of communication with the inlet of the perforated cylindrical member while this is in position in the vessel, for the purpose of blowing air through the roll of fabric.

8. Apparatus for removing dressings from fabrics, comprising a containing vessel; a hollow perforated cylindrical member on which the fabric to be treated is wound in the form of a roll, said hollow perforated cylindrical member being closed at its upper end and having an inlet for scouring liquid at its lower end and adapted to be arranged vertically in the containing vessel; a layer of porous material closely surrounding the perforated cylindrical member and adapted to assist uniform distribution of the scouring liquid to the roll of fabric; flanges on the perforated cylindrical member and adapted to

close the ends of the roll of fabric thereon, at least one of said flanges being slidable on the cylindrical member and adapted to be pressed endwise against the roll of fabric and held in position; a supply conduit for the scouring liquid; means for detachably connecting the inlet of the perforated cylindrical member to the supply conduit when the cylindrical member is placed vertically in position in the vessel; means for controlling the liquid supply to the inlet of the perforated cylindrical member; and a compressed air pipe adapted to be put into and out of communication with the inlet of the perforated cylindrical member while this is in position in the vessel, for the purpose of blowing air through the roll of fabric.

In testimony whereof I have hereunto subscribed my name.

CHARLES FIELD RYLEY.