Aug. 13, 1929. F. E. STRUVE 1,724,230

YARN CONDITIONING MECHANISM

Filed Feb. 18, 1928

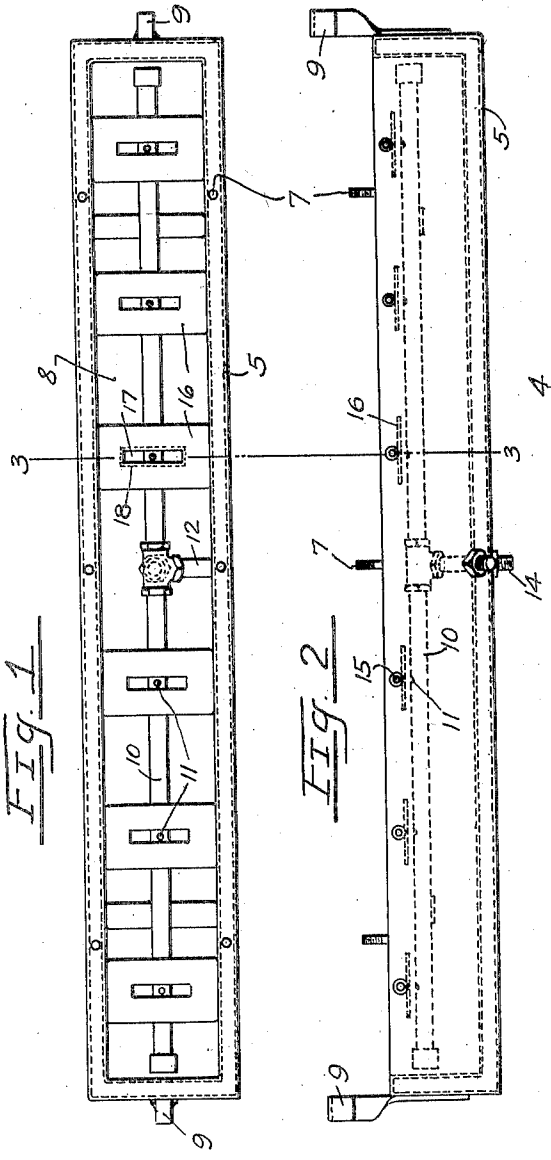


Fig. 1

Fig. 2

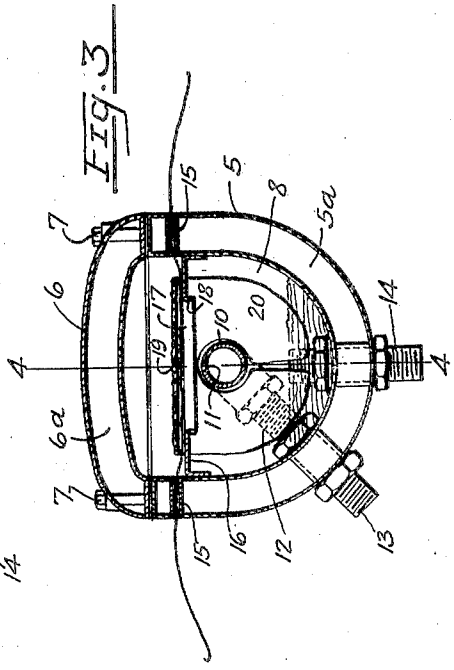


Fig. 3

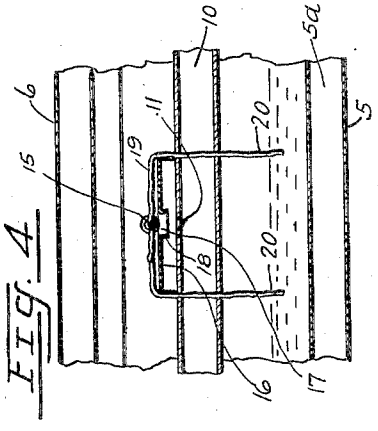


Fig. 4

Frederick Elwood Struve,

INVENTOR,

BY W. F. B. Stewart

ATTORNEYS.

Patented Aug. 13, 1929. 1,724,230

UNITED STATES PATENT OFFICE.

FREDERICK ELWOOD STRUVE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO TEXTILE MACHINE WORKS, OF WYOMISSING, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

YARN-CONDITIONING MECHANISM.

Application filed February 18, 1928. Serial No. 255,381.

My invention relates to means for conditioning yarn preparatory to its fabrication, and more particularly to a device and process for this purpose arranged to act directly on the passing yarn as it is fed to the machine; my main objects being to produce an improved and simplified conditioner which may form a convenient machine attachment, provide for its proper insulation so as to avoid heat radiation, and insure a more effective treatment through a simultaneous subjection of the passing yarn to the direct action of a steam jet and the wiping action of a saturated fabric strip.

With these main objects in view, and with others that will appear as the description progresses, my invention consists of the new process and improved structure for conditioning yarn as more fully described in the following specification in connection with the drawings accompanying the same and forming part thereof, the novel features being pointed out in the subjoined claims.

Fig. 1 is a plan view, with the cover removed, of a preferred form of conditioning tank embodying my invention.

Fig. 2 is a corresponding side elevation of the same.

Fig. 3 is an enlarged cross-sectional view on the line 3—3 of Figs. 1 and 2, and showing the tank cover in position thereon.

Fig. 4 is a partial longitudinal sectional view on the line 4—4 of Fig. 3.

The conditioning of yarn, particularly when formed of natural silk, is a recognized prerequisite to its proper fabrication. Such conditioning commonly involves subjecting the yarn to the action of steam for the purpose of rendering it more pliable or flexible and the resultant fabric softer and more agreeable to the wearer, and has been effected either in bulk, with inherent inequalities in the inner and outer windings of the usual cones or cops, or on the passing strand in its feed passage to the knitting machine or the like. My present invention is particularly adapted to the treatment of the yarn during its passage to the fabricating machine, though obviously applicable to the strands during a winding operation.

The drawings show a preferred embodiment of my device particularly designed as a readily applied attachment to the upper frame of a full fashioned knitting machine and adapted to act directly on the passing yarn just prior to its introduction to the knitting needles.

Referring to the drawings, 5 indicates a receptacle or tank, preferably U-shaped in cross-section as shown, and having a cover or lid 6 secured thereto as by bolts 7 so as to form an enclosed steam chamber 8. This tank, as indicated, may correspond in length with the usual connected series of knitting machine sections, and is provided with end ears or lugs 9 for its convenient attachment to the machine frame; though obviously it may be shorter or longer depending upon the number of individual yarns to be simultaneously conditioned.

To prevent heat radiation with resulting waste and objectionable increase of room temperature, I preferably form the tank 5 with spaced walls as shown, providing an insulating chamber 5^a which may be filled, if desired, with a non-conducting material such as magnesium or the like; and also form the lid 6 in a similar manner with an insulating chamber 6^a.

Within the tank 5 is mounted a longitudinally extending steam pipe 10 having upwardly directed spaced jet apertures 11, and a supply pipe 12 projected through the tank wall and properly fitted thereto to form a water tight connection, the outer end 13 of said supply pipe being threaded for connection to a steam supply line. The tank 5 is also provided with an outlet pipe 14 projected through the bottom wall thereof and suitably fitted to form a water tight connection, the inner end thereof preferably extending upwardly into said tank, as shown, to maintain a determined liquid level of the steam condensation. The tank 5 is further provided with a plurality of alined yarn guide apertures 15, 15, in the side walls thereof as shown above the jet apertures, and at a proper height with relation to the latter so that each yarn passing transversely through said tank will extend directly above a steam jet aperture 11 as indicated, to receive the treating action of the steam therefrom.

To improve such conditioning action of the steam jet on the passing yarn so as to more effectively treat the latter, I employ, as shown, a series of bridge plates 16, 16, 16, transversely mounted in the tank with their

upper surfaces substantially alined with the yarn guide apertures 15, 15 and each plate having a central elongated opening 17 located directly above and close to a jet aperture 11, said opening preferably having a downwardly extended flange 18.

These bridge plates form a support for the passing thread which latter, as indicated passes lengthwise over the opening 17 for direct action of the steam from jet 11; and each of said plates also carries a yarn wiping fabric strip 19, of absorbent material such as felt or the like, said strips resting upon and covering the passing yarns and preferably overhanging the edges of said plates with their depending ends 20, 20, duly cut to receive the steam pipe 11 and fit the tank shape, dipping below the water level maintained by outlet pipe 14, so that capillary attraction will keep said strips in a saturated condition.

The action of such saturated felt strip 17, resting upon the passing yarn, exerts a retarding tension on the latter and insures its thorough moistening, and the flange 18 surrounding the opening 17 beneath said cover 19 forms a confining chamber to hold the steam from jet 11 and insure thorough direct soaking of the yarn passing across said opening. Such moistening of the yarn before the action of the direct steam, followed by further moist wiping produces an improved and more effective conditioning treatment than hitherto secured and insures a more flexible working yarn and softer fabric.

The saturation of the strip 17 may be provided by the direct condensation of the steam impinging against the same without use of the depending extensions 20, 20; or its saturation may be secured by a direct supply of liquid thereto from an outside source. The thickness of the fabric strip may be varied so as to increase or decrease its retarding tension with resultant different moistening and wiping action on the yarn. And instead of a series of bridge plates with individual fabric strips, a single long plate with a long covering fabric strip may be used. Other modifications within the spirit of my invention may readily be devised, the essential novelty residing in the general structure disclosed providing for the novel process of conditioning the passing yarn as specifically defined in the subjoined claims.

What I claim is:

1. A yarn conditioning device comprising a liquid tank having a jet-apertured steam pipe therein, yarn passage-ways in the opposite walls thereof above said apertured pipe, a thread supporting bridge plate having its upper surface approximately in alinement with said passage-ways, and a thread wiping fabric strip carried by said bridge plate above the passing thread.

2. A yarn conditioning device comprising a liquid tank having a jet-apertured steam pipe therein, yarn-guide passage-ways in the opposite walls of said tank above said apertured pipe, a centrally apertured thread-supporting bridge plate having its upper surface approximately in alinement with said passage-ways, and a thread wiping fabric strip on said bridge plate covering said plate aperture and passing yarn.

3. In a yarn conditioning device comprising a liquid tank, having yarn passage-ways in opposite walls thereof, and a jet-apertured steam pipe; a thread-supporting bridge plate arranged between said passage-ways with its upper surface approximately alined with the latter and having an opening above said steam pipe, and a thread wiping fabric strip on said bridge plate covering said opening above the passing thread.

4. In a yarn conditioning device comprising a liquid tank, having yarn passage-ways in opposite walls thereof, and a jet-apertured steam pipe; a thread-supporting bridge plate arranged between said passage-ways with its upper surface approximately alined with the latter and having an opening and steam-confining flange above said steam pipe, and a thread wiping fabric strip on said bridge plate forming a steam confining chamber above the passing thread.

5. A yarn conditioning device comprising a liquid tank having a longitudinally extending steam pipe therein provided with a plurality of jet apertures, a corresponding plurality of transverse yarn passage-ways in the opposing walls of said tank, above said steam pipe, an apertured thread-supporting bridge plate between each of said opposed yarn passage-ways, and a thread wiping fabric strip carried by each of said bridge plates.

6. A yarn conditioning device comprising a covered and heat-insulated liquid tank having a water level outlet pipe and a steam pipe extending longitudinally therein and provided with a series of spaced jet apertures, a corresponding transverse series of yarn passage-ways in the opposing walls of said tank, thread-supporting bridge plates connecting said series of yarn passage-ways, each having a central opening and depending flanges above the respective jet apertures, and a thread wiping fabric strip on each plate depending therefrom into the liquid.

In testimony whereof I affix my signature.

FREDERICK ELWOOD STRUVE.