

Oct. 3, 1950

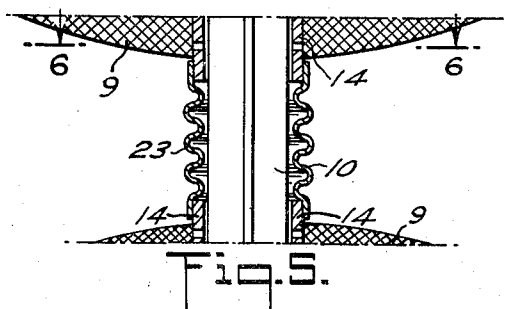
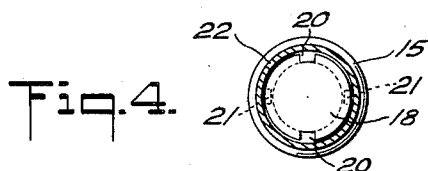
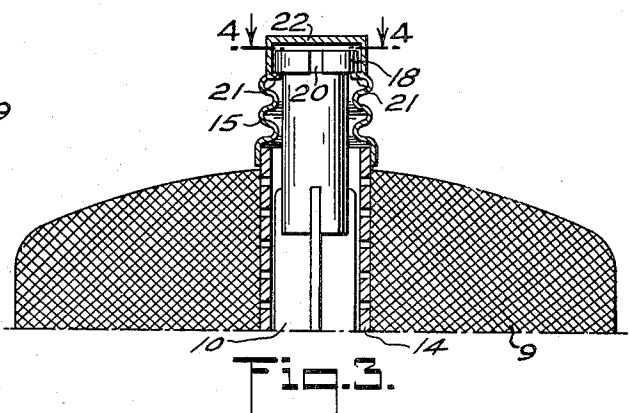
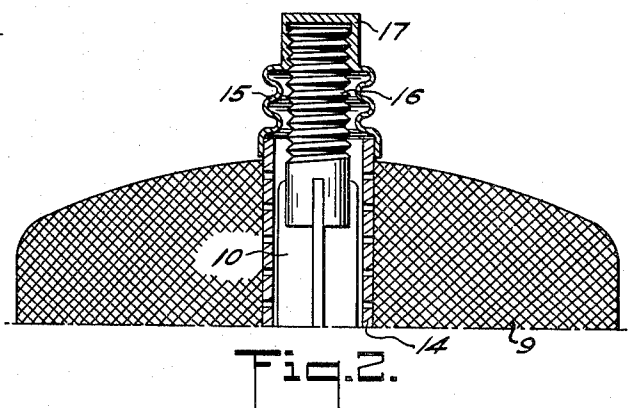
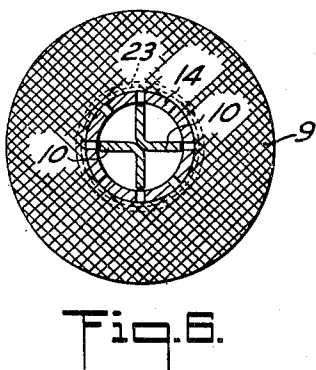
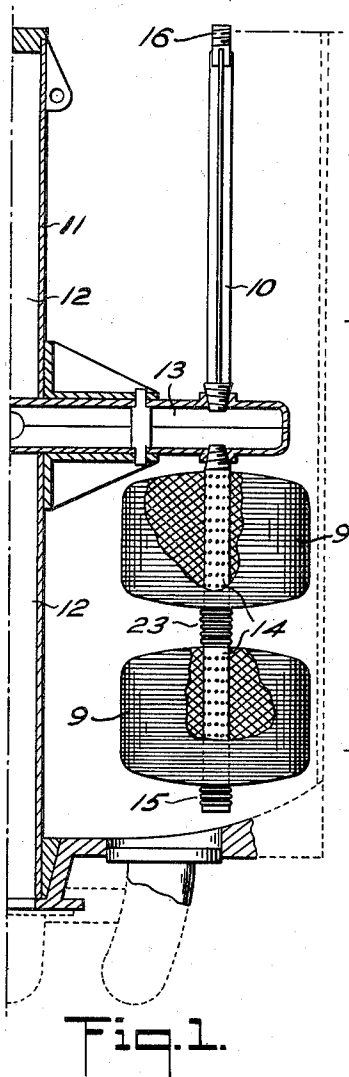
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2,524,629

MOUNTING FOR YARN PACKAGES

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2 Sheets-Sheet 1



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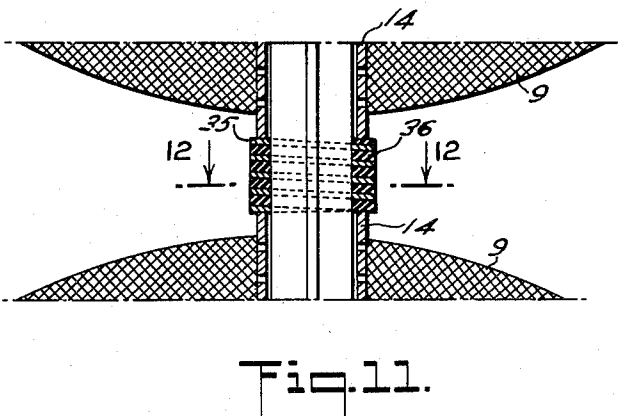
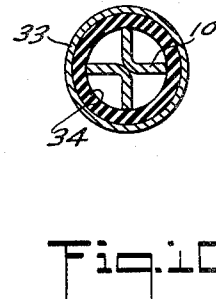
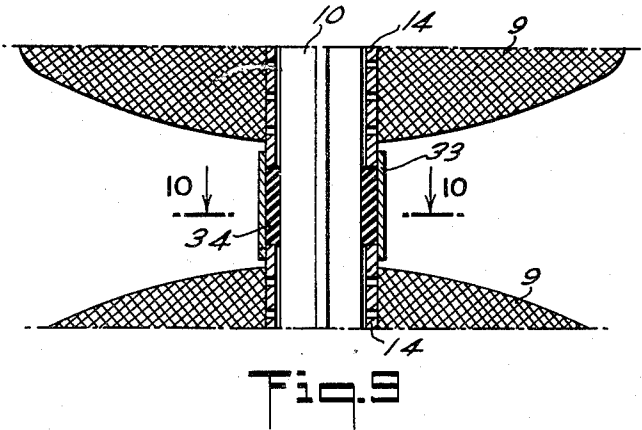
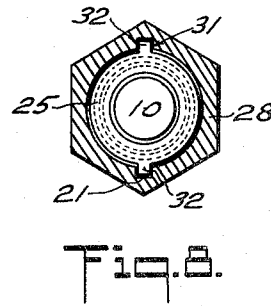
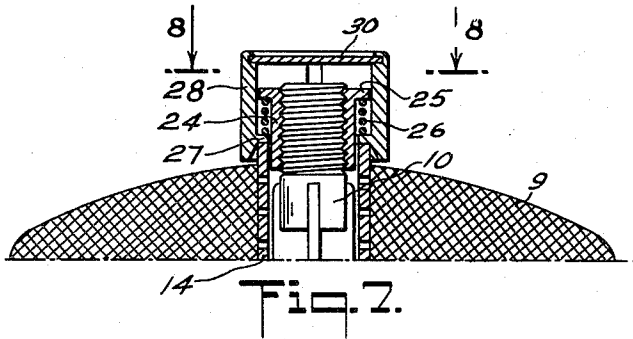
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MOUNTING FOR YARN PACKAGES

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

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## MOUNTING FOR YARN PACKAGES

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The present invention relates to yarn packages and more particularly to the mounting of such packages upon the spindles of a carrier for use in yarn driers, dyeing machines and other treating equipment wherein the parts are subjected to a heated medium.

In package treating apparatus of the type having metal spindles for respectively entering the perforated tubes (upon which the yarn is wound as a package) to hold the packages in place during the circulation of dye, air or other medium through the packages, the high temperature of the treating medium causes the spindles to expand endwise relative to the tubes which are non-metallic. Since each spindle is provided with a closure to seat over the end of the tube as a seal, this expansion unseats the closure and causes leakage of the medium thereby, not only prolonging the particular treating step, but in the case of a dyeing operation causing spotty and uneven dyeing. The mentioned closures have been threaded heretofore upon the spindles and when the carrier of the packages is accessible, as when subjected to the circulation of hot air, the operator is obliged to be continually tightening the closures against the tube ends, reaching successively from spindle to spindle in a tiresome and endless operation, because each package carrier usually mounts a large number of such spindles. Where the carrier is of the type having downwardly disposed spindles as well as upwardly disposed spindles, that two groups of spindles separated by a transfer header, the operator must lie on the floor, twist his body in unnatural positions, and stretch his arms under the carrier to reach and tighten the closures displaced by the spindle expansion. When the carrier is in a dye vat and the yarn is being dyed, the closures are entirely inaccessible so that the expansion, always present, results in by-passing an appreciable quantity of dye liquor out the ends of the tubes instead of through the yarn packages. This problem has not been solved heretofore.

Some of the objects of the present invention are: to provide an improved means for holding a yarn package on a spindle of a treating machine; to provide means for holding a yarn package on a spindle in leak-proof relation regardless of expansion of the spindle due to heat of the treating medium; to provide means for automatically maintaining a sealing relation between the spindle of a yarn package and the yarn package tube which encircles the spindle; to provide a sealing device functioning to prevent treating liquid within the perforated tube of a yarn

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package from leaking over the end of the tube to the outside of the package; to provide a novel and efficient means for compensating for the expansion of yarn package spindles and preventing leakage of dye liquor when the spindle carrier is in a dye vat; and to provide other improvements as will hereinafter appear.

In the accompanying drawings, Fig. 1 represents a fragmentary sectional elevation of a yarn package carrier showing an upstanding spindle for receiving packages and a downwardly disposed spindle mounting two yarn packages equipped with sealing devices embodying one form of the invention; Fig. 2 represents a fragmentary sectional elevation of the upper end of a yarn package mounted on the spindle of a package carrier and showing a sealing device embodying the invention; Fig. 3 represents a like view showing a modified form of the invention; Fig. 4 represents a section on line 4—4 of Fig. 3; Fig. 5 represents a fragmental axial section showing a sealing device of the invention as disposed between two superposed yarn packages; Fig. 6 represents a section on line 6—6 of Fig. 5; Fig. 7 represents a fragmentary sectional elevation of an end of a yarn package mounted upon a spindle and showing another modified form of the invention; Fig. 8 represents a section on line 8—8 of Fig. 7; Fig. 9 represents a fragmental axial section showing a modification of the sealing device as disposed between two axially aligned yarn packages; Fig. 10 represents a section on line 10—10 of Fig. 9; Fig. 11 represents a section similar to Fig. 9 but showing another form of compensating spacer.

Referring to the drawings, one form of the present invention is shown as applied to the metal spindle 10 of a package carrier 11, the latter, for example, being of the type having a central circulating pipe 12 in communication with an encircling header 13 from which a plurality of the spindles 10 project in opposite directions, such as shown in United States Patent No. 2,218,310.

For mounting the yarn packages 9 on the spindles 10 and at the same time sealing the end of the perforated tube 14 upon which the yarn is wound, one form of the invention comprises a compressible bellows unit 15 which is open at one end, to fit over the projecting threaded end 16 of the spindle 10, and is accurately dimensioned to seat upon the end of the package tube 14 and form a leak-proof joint therewith. As shown in Fig. 2, the unit 15 has an internally threaded head 17 which when screwed upon the spindle

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end 16 places the unit 15 under such compression as will effectually seal the joints exposed to the treating liquid.

In the modification shown in Fig. 3, the spindle 10 terminates in a head 18 having two oppositely disposed slots 20 for respectively receiving two laterally located pins 21 provided upon the inner periphery of the closed head 22 of the unit 15, thereby forming a bayonet joint. Thus, by telescoping the unit 15 over the head 18, the pins 21 will traverse the slots 20 until below the head 18 when a partial turn of the unit will bring the pins 21 beneath the head 18 and hold the unit compressed but free to expand should the spindle elongate under the heat of the treating medium, so that joint with the package tube still remains sealed at its upper end.

Where more than one yarn package is carried by a single spindle, as shown in Fig. 1, one form of the invention comprehends the use of a bellows unit 23, of the tubular corrugated expandable type, having tube-receiving seats at opposite ends, is interposed between the juxtaposed ends of the perforated tubes 14, while a second unit of the kind shown in Fig. 2 or Fig. 3 is attached to the free end of the spindle. Thus, the differential expansion of the spindle with respect to the package tubes is automatically taken up by the two units 15 and 23 and opening up of the end joints of the tubes prevented.

In the form of the invention shown in Figs. 7 and 8, a compensating assembly is shown comprising an elongated nut 24, threaded on the end of the spindle 10, having a flange 25 at its outer end serving as an abutment for one end of a coil spring 26. The other end of the spring 26 seats upon an internal annular ledge 27 formed as a part of a cap housing 28, the closed end of which comprises a cover 30 crimped into place after the parts are nested together. As shown, the housing 28 has the contour of a hexagon nut for engagement by a wrench or other tool for threading the nut 24 on the spindle 10. Such turning movement is transmitted to diametrically and longitudinally disposed grooves 31 on the inner periphery of the housing 28 to respectively receive two tongues 32 projecting laterally from the flange 25. The ledge 27 is spaced from the open end of the housing 28 and forms with the outwardly flared skirt of the housing a seat to receive the end of the package tube 14.

In assembling the unit upon a spindle 10 the housing 28 is seated upon the end of the package tube 14 with the nut 24 engaging the threaded end of the spindle 10, whereupon by turning the housing 28 the nut 24 feeds outwardly along the spindle to place the spring 26 under compression to the extent necessary to compensate for the full anticipated expansion of the spindle 10 under operating conditions. Thus, as expansion occurs, the nut 24 can move linearly with it but since the spring 26 is held under compression against the ledge 27, the housing 28 remains sealed about the end of the package tube 14.

In Figures 9 and 10, a modified form of the invention is shown as a spacing unit between the juxtaposed ends of two aligned package tubes 14, this unit comprising a cylindrical sleeve 33 having a diameter to fit about the outer periphery of the tubes 14 and having a length to overlap and seal the space between the two tubes. As a means for maintaining the seal when the spindle expands or for other reasons, a collar 34 of rubber or other resilient material is vulcanized within the sleeve 33, and has a length less than the

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length of the sleeve and a thickness such as to be compressed between the opposed ends of the tubes 14. Thus, should one package tube move away from the other due to pressure, turbulence or expansion, the elasticity of the collar 34 will prevent opening of either joint of the tube 14.

In the form of the invention shown in Figs. 11 and 12, a modified form of spacer unit for use between two aligned tubes 14 is shown, comprising a coiled flat spring 35 molded or vulcanized within a cylinder 36 of rubber or other resilient material. The length of the cylinder 36 is such as to close and seal the space between the opposed ends of two tubes 14, when compressed by the drawing together of the tubes during the mounting of the tubes upon the spindle 10. Any movement thereafter tending to draw the tubes apart will permit the elasticity of the spring and cylinder to maintain the desired sealed condition.

While in the foregoing emphasis has been placed upon the expansion of the spindle under heat as the cause of backing off of the closure nut, this may also be caused by the turbulence of the flow of liquid or air as it circulates through the perforated tube of the yarn package. Thus, whether the tendency to break the seal of the spindle nut is caused by vibration, pressure, or heat, the automatic expansion unit functions to prevent this tendency becoming effective.

It will now be apparent that an efficient seal has been devised for the ends of the package yarn tubes when mounted upon spindles which are subject to expansion under heat of the treating medium. This leak-preventing means is effective whether the yarn packages are being dyed or dried so that the operator no longer has to be continually adjusting parts to seal off leaking tubes. As a result, treating operations are reduced to a minimum time interval, waste is obviated, and in the case of dyeing, more uniformity is obtained. While an expansible unit of the bellows type is here shown by way of example, the invention is not so limited but comprehends broadly a closure for the package tube ends which is capable of expanding throughout the possible range of spindle expansion under the heat of the treating medium.

I claim:

1. A mounting for yarn packages wound upon a perforated tube, comprising a spindle arranged to pass axially within said tube, and expansible means open at one end to fit over an end of said tube and attached at the other end to an end of said spindle to be normally under compression to seal said end of said tube, said means being maintained under said compression throughout the expansion range of said spindle, whereby said sealing means functions to prevent leakage through the end of said tube incident to spindle expansion.

2. A mounting for yarn packages wound upon a perforated tube, comprising a spindle arranged to pass axially within said tube, and a bellows unit open at one end to fit over an end of said tube and attached at the other end to an end of said spindle to be normally under compression to seal said end of said tube, said unit being maintained under compression throughout the expansion range of said spindle, whereby said unit prevents leakage through the end of said tube incident to spindle expansion.

3. A mounting for yarn packages wound upon a perforated tube, comprising a spindle arranged to pass axially within said tube, a bellows unit

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open at one end to seat over the end of said tube, and threaded means to attach the opposite end of said unit to said spindle to place said unit under compression and maintain said compression throughout the expansion range of said spindle, whereby leakage through the end of said tube is prevented when said spindle expands.

4. A mounting for yarn packages wound upon a perforated tube, comprising a spindle arranged to pass axially within said tube, a bellows unit open at one end to seat over the end of said tube, and bayonet joint means to attach the opposite end of said unit to said spindle to place said unit under compression and maintain said compression throughout the expansion range of said spindle, whereby leakage through the end of said tube is prevented when said spindle expands.

5. A mounting for yarn packages wound upon a perforated tube, comprising a spindle arranged to pass axially within said tube, a closure of expansible material for an end of said tube, said closure encircling said spindle, and means carried

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by said spindle for compressing said closure to a degree to maintain said compression throughout the expansion range of said spindle, whereby leakage around the end of the tube is prevented regardless of any relative movement between said spindle and said tube.

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