Dec. 1, 1953 R. D. ROBINSON ET AL 2,660,763

METHOD AND APPARATUS FOR APPLYING LIQUIDS TO FIBERS

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Fig. 1.

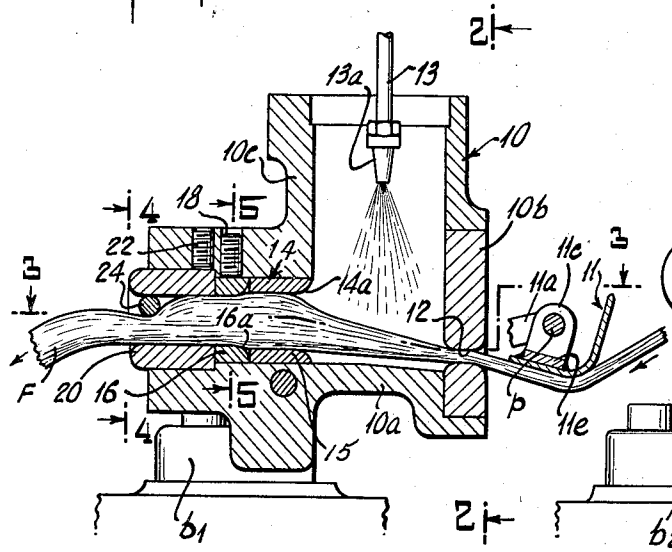


Fig. 2.

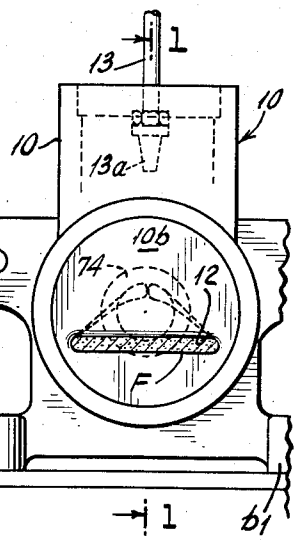


Fig. 3.

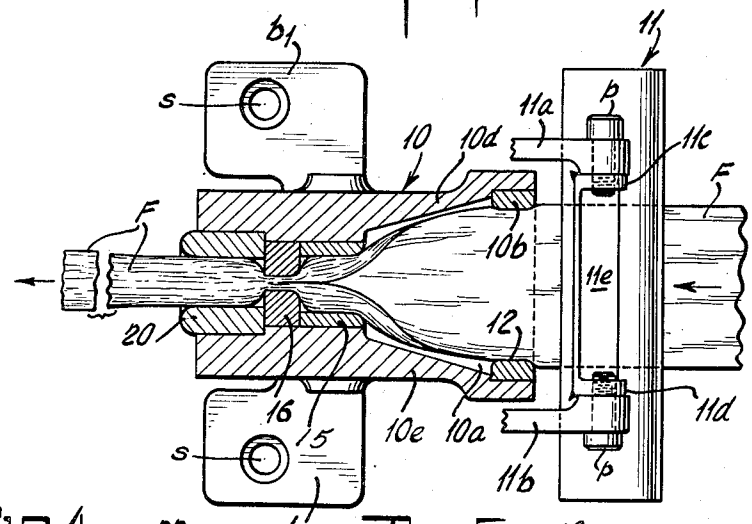


Fig. 4.

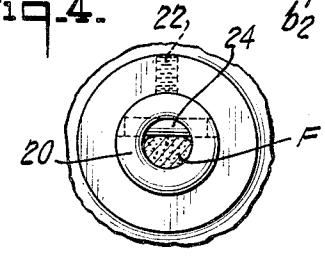
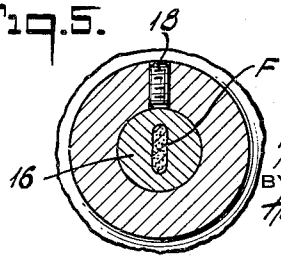


Fig. 5.



INVENTORS:
ROBERT D. ROBINSON.
RAYNALDO P. JACQUES
BY
Hoag, Kilburn & Carlson.
ATTORNEYS:

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METHOD AND APPARATUS FOR APPLYING LIQUIDS TO FIBERS

Robert D. Robinson, Uxbridge, Mass., and Raynaldo P. Jacques, Woonsocket, R. I., assignors to Bachmann Uxbridge Worsted Co., Inc., Uxbridge, Mass., a corporation of Massachusetts

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7 Claims. (Cl. 19—66)

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This invention relates to the application of liquids to fibers of a wide variety of kinds, and particularly to fibrous ropes, slivers and the like.

It is a common textile practice to add a low viscosity oil to fibers in web or sliver form as an aid to subsequent textile operations. Also textile practice often calls for straining such webs or slivers with fugitive or easily removable dyes for purposes of identification. The prior art method and apparatus for so doing is unsatisfactory since the liquid is not satisfactorily contained and controlled and is applied unevenly and at such spaced intervals that, in the case of fugitive dyes, concentrations must be used which are difficult to wash out. Thus, for example, one present practice is to apply such oils or dyes by means of transfer from a paddle-wheel device. The points of transfer of liquid are where the paddle-wheel touches the textile web or sliver. When using dyes or stains it is necessary, when using paddle-wheels, to use concentrated solutions for this purpose, resulting in wetted fibers from which the identifying dye cannot be easily removed.

It is an object of this invention to apply liquids to fiber surfaces without substantially wetting the fiber interior.

Another object of this invention is to apply liquids uniformly to a surface of a length or sliver of moving fibers.

Another object of this invention is to apply liquids to the surface of fibers without splattering the applying device or nearby workmen.

Other objects of the invention will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts, and in the several steps and relation and order of each of said steps to one or more of the others thereof, all as will be pointed out in the following description, and the scope of the application of which will be indicated in the following claims.

The invention will best be understood if the following description is read in connection with the drawings, in which,

Figure 1 is a view of an embodiment of the invention largely in vertical cross section, taken on line 1—1 of Figure 2;

Figure 2 is a view of the front or inlet end of the device, taken on line 2—2 of Figure 1;

Figure 3 is a plan view partly in horizontal cross section, taken on line 3—3 of Figure 1;

Figure 4 is a fragmentary cross-sectional view looking in the direction of the arrows 4—4 as indicated in Figure 1; and

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Figure 5 is a fragmentary cross-sectional view taken on line 5—5 of Figure 1.

As shown in the drawings, a continuous length or sliver of fibers F is advanced continuously by means not shown into and through the interior of chamber 10 prior to which it is flattened and widened by being passed over and around the curved surface of contact member 11 which is mounted for oscillation between arms 11a and 11b, the ends of which are pivotally mounted by pivots *p* to the ears 11c and 11d of U-shaped bracket 11e which projects from the upper surface of member 11.

Chamber 10 is illustrated herein as a rectangular chamber including, a base portion 10a including laterally extending portions b_1 and b_2 which are shown provided with screw holes *s* to facilitate attachment of the assembly to a machine or other support surface; front wall 10b in which slot 12 is provided; the rear wall 10c which includes a rearwardly projecting portion through which extends the outlet passage 14 leading from the chamber 10; and the side walls 10d and 10e respectively which are inclined rearwardly toward said discharge passage and which serve to turn inwardly the edges of the thin web-like sliver which is passed through the chamber and the width of which corresponds substantially with the length of entrance slot 12. Extending into the chamber 10 is a liquid conduit 13 adapted for conveying lubricating oil, fugitive dye, emulsions and the like, said conduit preferably having a spray head 13a positioned to direct a spray of liquid on the web-like sliver as it passes through chamber 10. Means of known kind may be provided for controlling the flow of liquid in conduit 10 so that the flow is cut off except when sliver F is in motion.

The chamber outlet passage comprises a first portion which is of substantially less width than the interior of chamber 10 and as shown herein is defined by the ring insert 15, the front or entrance edge 14a of the ring being curved inwardly to receive and contact the fiber web with a minimum of friction.

Behind annular ring 15 the discharge passage is constricted laterally forming a space which is of greater dimension at right angles to slot 12 and the width of the web F in passing through the chamber 10 than in a direction parallel with the web or sliver F. Within this space the action of turning in the edges of F, begun by the side walls 10d and 10e of the chamber 10, and furthered by passage of the web through the first portion, 15, of the discharge outlet, is developed into a folding action folding the two halves of the

web upwardly from its longitudinal median line into substantially parallel planes. As shown herein the folding action is accomplished by a ring insert, 16, positioned just behind and in abutting relation to ring 15, and defining a space the width of which is less tthan its height and less than the width of the space defined by ring 15 but the height of which is substantially the same or only slightly less than the diameter of ring 15. The forward edge 16a of ring 16 is desirably curved inwardly.

In order that rings similar to ring 16 but with different sized apertures may be readily substituted within the said passage the rearward extention of wall 10c of the chamber is desirably bored to receive a set screw 18 by which ring 16, or other similar rings with different sizes of apertures may be secured in place within the discharge passage.

The portion of the discharge passage to the rear of ring 16 is of the cross section desired for the wetted sliver and is shown herein as substantially circular. To facilitate the production of slivers of different diameter this portion of the passage, as shown herein is defined by a removable annular ring 20 and the rearwardly extending portion of chamber wall 10c is bored to receive a set screw 22 by means of which ring 20, or a substitute ring, may be held in place in abutting relation to ring 16.

For aiding in the removal of any excess liquid from the surface of the sliver as it leaves the discharge passage, and for constricting the fibers so that they will balloon out upon discharge from the passage, a cross pin 24 is provided extending across the interior of the orifice defined by ring 20, and as shown in the drawing is positioned at the top of the orifice. Pin 24 serves the purpose of a flange on the interior of ring 20 and is preferred because it is easier and less expensive to manufacture.

Upon leaving the discharge passage, a large portion of the fibers comprising the sliver are wetted lightly and evenly with the liquid introduced into chamber 10, and because the liquid is introduced preferably as a mist, and because of the folding and constriction of the sliver after leaving the interior of chamber 10, it is markedly free from excess liquid and the applied liquid is retained within the sliver without substantial loss. It will be understood that the volume of the liquid sprayed onto the sliver in chamber 10 should be adjusted to the size and nature of the fibrous sliver, and that the moving sliver will tend to take up any liquid accumulating within the chamber and also serve to prevent escape of liquid through the entrance slot or the discharge orifice by filling said slot and said orifice.

The method and the applicator apparatus disclosed herein may be applied as an aid in the manufacture of various textile products and at various stages of manufacture. As one example, it may be usefully applied in the manufacture of woolen and worsted fabrics to wet the web or sliver coming from a textile machine, such for example as a pin drafter, and in advance of the coiling of the sliver.

The applicator described herein has the advantage of applying liquid to the fibers of a sliver so that a large proportion of the fibers are lightly and evenly wetted, thereby facilitating the working of the fibers in the case of a lubricant, and making it possible, in the case of the application of a fugitive dye to the fibers, to use a low concentration of the dye for identification and to thereafter readily remove the dye, at the same time conserving the liquid and eliminating the splashing characteristic of many of the prior art processes, and producing slivers of desired size and cross sectional shape.

It will thus be seen that there has been provided by this invention a method and apparatus in which the various objects hereinabove set forth together with many thoroughly practical advantages are successfully achieved. As various possible embodiments might be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

We claim:

1. Apparatus for applying liquids to fibrous webs and the like comprising a chamber having an inlet slot and an extended outlet passage, means extending into the chamber for discharging a spray of liquid on a web of fibers moving through said chamber, and a member removably mounted in said outlet passage and defining an outlet port having its greater dimension in a plane substantially at right angles to the plane of said entrance slot.

2. The method of handling fibers while applying liquid to them which comprises initially arranging the fibers in a thin web disposed in a first plane, folding the length of fibers into a substantially rectangular web disposed in a second plane, and spraying liquid onto the surface of said web while it is being folded into said substantially rectangular web, changing the cross section of the web from rectangular to circular, and simultaneously scraping the resulting sliver and constricting it so that the fibers comprising the sliver will balloon out when released from the constricting force.

3. The method of applying liquid to fibers which comprises passing a length of fibers into a closure as a thin web disposed in a first plane, folding the length of fibers within the closure into a web of substantially rectangular cross section disposed in a second plane substantially at right angles to said first plane, and spraying liquid onto the surface of said web while it is being folded, changing the cross section of the web from rectangular to circular and discharging it from said closure.

4. An apparatus for applying liquids to fibers comprising a housing defining a closure having an entrance slot and a discharge passage terminating in a substantially circular discharge orifice, means for spraying liquid on the surface of the web of fibers passing through said closure, and means intermediate said slot and said orifice for folding said web and converting it from a thin web to a sliver of substantially rectangular cross section, said means comprising a slot having its greatest dimension substantially at right angles to the plane of said entrance slot.

5. Apparatus for applying liquids to fibers comprising a closed chamber having an entrance slot in one wall for the admission of a thin web of fibers and having a discharge passage in another wall for the discharge of fibers from said chamber in a sliver of substantially circular cross section, said discharge passage comprising a second slot disposed at right angles to said entrance slot and a portion of circular cross section, positioned to receive the sliver after it has passed

through said second slot, said chamber being partly defined by a wall portion tapering in the direction of said discharge passage, and means for introducing a spray of liquid into said chamber between said slots.

6. An apparatus for applying liquids to fibers comprising a closed chamber having an entrance port and an outlet portion, means for passing a length of fibers into and out of said chamber through said port and passages respectively, means for introducing a spray of liquid into said chamber, said outlet passage comprising a constricted portion forming a slot therein at right angles to the path of said length of fibers through said chamber, and means for initiating turning up the edges of said length of fibers to initiate folding action of the length of fibers which is completed by passage of the length through said slot.

7. An apparatus for applying liquids to fibers comprising a closed chamber having an entrance port and an outlet passage, means for passing a length of fibers into and out of said chamber through said port and passage respectively, means for introducing a spray of liquid into said chamber, said outlet passage comprising a constricted portion forming a slot extending at

right angles to the path of said length of fibers through said chamber, means for initiating turning up the edges of said length of fibers to initiate folding action of the length of fibers which is completed by passage of the length through said slot, and a cross member positioned in said outlet passage for removing excess liquid from the overlapped discontinuous lateral edges of said length of fibers.

ROBERT D. ROBINSON.
RAYNALDO P. JACQUES.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,542,180	Selden et al.	June 16, 1925
1,597,115	Selden et al.	Aug. 24, 1926
1,956,450	McGinnis	Apr. 24, 1934
2,115,218	Siever	Apr. 26, 1938
2,187,830	Jones	Jan. 23, 1940
2,203,423	Walsh et al.	June 4, 1940

FOREIGN PATENTS

Number	Country	Date
1,429	Great Britain	of 1863
682,512	Germany	Oct. 16, 1939