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[56]

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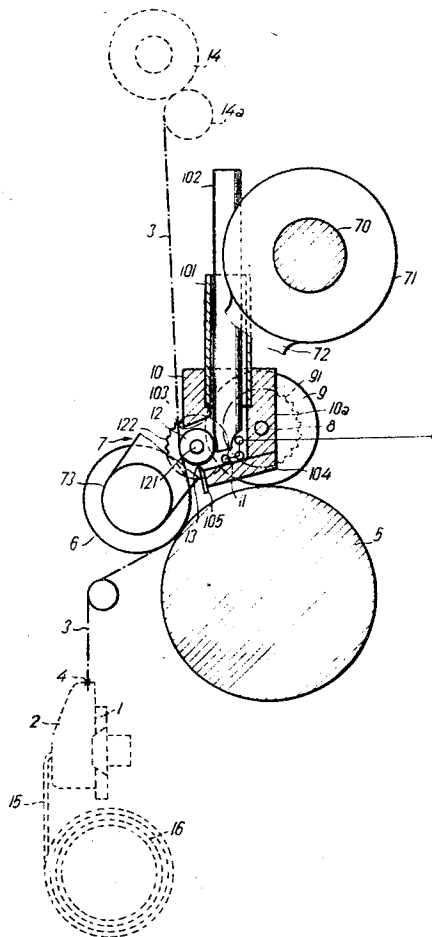
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[54] **APPARATUS FOR APPLYING A PROCESSING SUBSTANCE TO A TRANSPORTED YARN**
10 Claims, 2 Drawing Figs.

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 259

ABSTRACT: A processing substance is applied to a yarn withdrawn from a rotary suction spinning chamber in upright direction by a pair of transporting rollers. An upright tubular container for a stick of the substance is located adjacent the applicator roller, and is heated by a heater to melt so that the substance flows onto the applicator roller. One of the transporting rollers, the applicator roller, and the container are mounted on a movable support which can be raised to a servicing position.



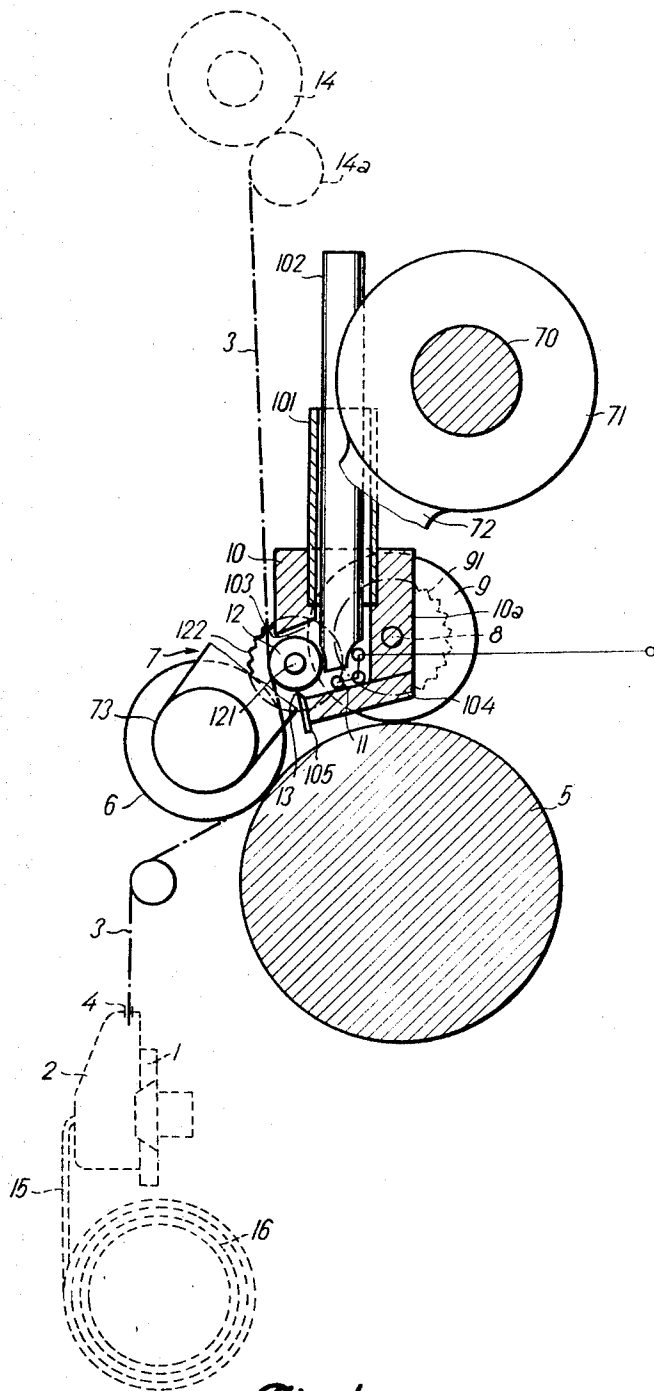


Fig. 1.

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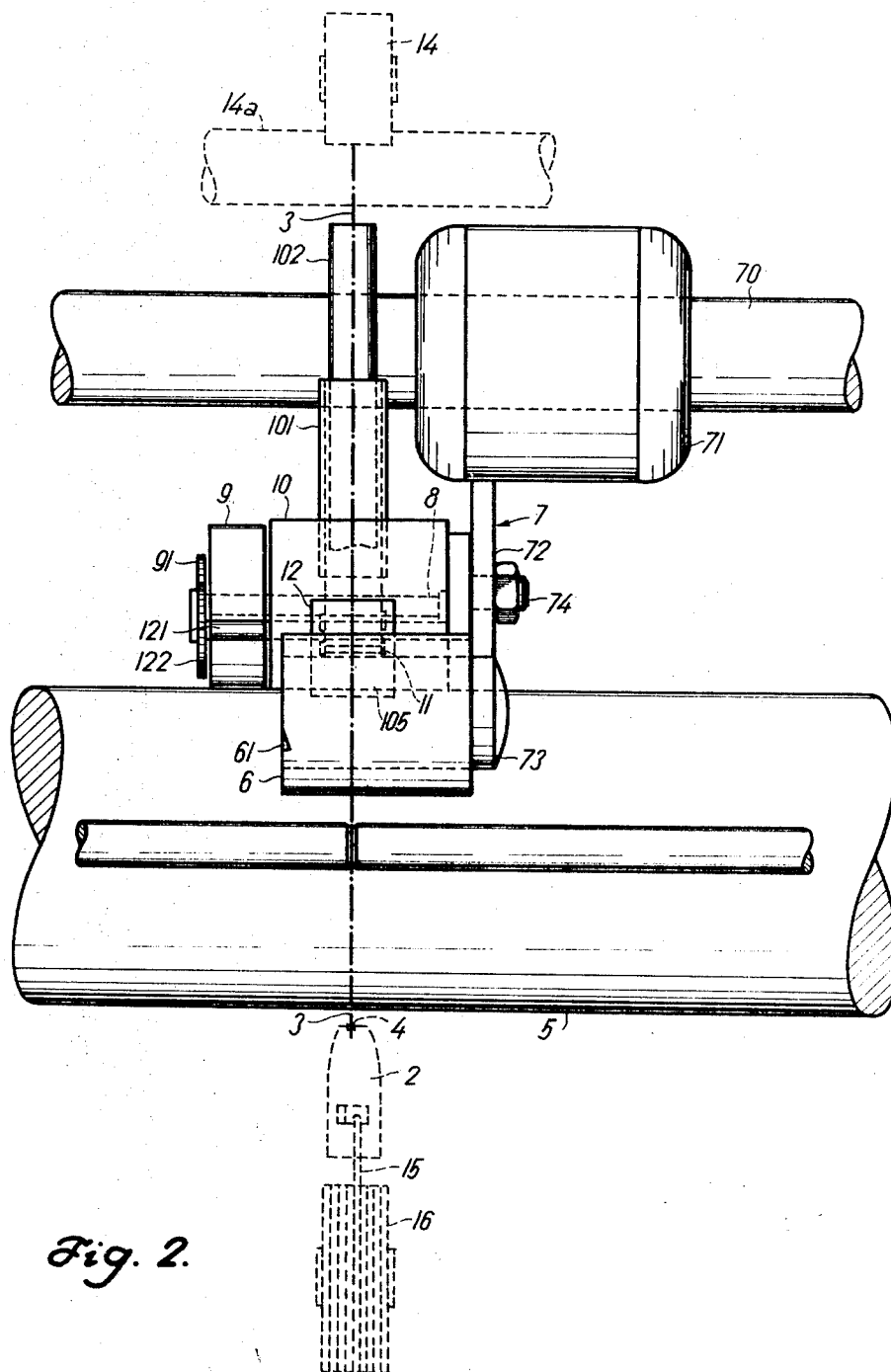


Fig. 2.

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APPARATUS FOR APPLYING A PROCESSING SUBSTANCE TO A TRANSPORTED YARN

BACKGROUND OF THE INVENTION

It is known to treat newly spun yarn in a winding machine by applying a substance by means of a roller which is dipped into a processing bath. The processing substance is distributed from a central supply to all winding units of the machine. The use of known processing apparatus of this type is not possible for spindleless spinning in which a rotary suction spinning chamber is used. Spinning apparatus of this type has higher operational requirements, and is arranged in such a manner that a conventional processing apparatus would obstruct the movements of the operator of the machine, and may impair fundamental functions of the machine, such as the trouble-free drawing off and winding up of the spun yarn, correction of yarn breakages and spinning-in of broken yarn ends.

SUMMARY OF THE INVENTION

It is one object of the present invention to provide a spindleless spinning machine with an apparatus for applying a processing substance to the spun yarn while the same is withdrawn.

Another object of the invention is to provide an apparatus for applying a processing substance to a transported yarn which takes up no space laterally of the transporting rollers.

With these objects in view, the container for the substance, and an applicator roller which is in contact with the yarn, are arranged directly over a pair of transporting rollers by which the yarn is transported. The substance is preferably in the form of a stick inserted into an upright tubular container at whose lower open end, the applicator roller is located. Heating means are also located at the lower end of the container for melting the lower end of the stick so that the substance flows onto the applicator roller.

Preferably, an adjustable bottom gate plate is provided at the lower end of the container and has an edge forming a gap with the applicator roller so that the thickness of the layer of the substance on the applicator roller is determined by the position of the bottom gate plate.

One embodiment of the invention comprises yarn supply means which may include a rotary spinning chamber; yarn takeup means above the yarn supply means, and preferably including winding apparatus; a pair of yarn transporting rollers for transporting a yarn along an upright path from the spinning chamber to the takeup means; supporting means, preferably mounted for angular movement; a container, preferably an upright tubular container, mounted on the supporting means over the transporting rollers and having a cavity for holding the processing substance, preferably in the form of a solid meltable stick; and an applicator roller mounted on the container for rotation partly located in the lower open end of the cavity opposite the transported yarn and engaging the same adjacent one of the transporting rollers for applying the substance to the same.

If the substance has the form of a meltable stick, an electric heating means is mounted at the lower end of the container melting the lower end of the stick which is adjacent the applicator roller.

In the preferred embodiment, the container with the applicator roller, and one of the transporting rollers, are mounted on an angularly movable support so that the same can be moved away from the other transporting rollers for inspection and servicing of the apparatus.

It is possible to drive the applicator roller directly from one of the transporting rollers, or a gear transmission may connect the applicator with one or the other of the transporting rollers so that the applicator roller is continuously rotated for applying the substance to the yarn.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construc-

tion and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a vertical sectional view of the embodiment of the apparatus of the invention; and

FIG. 2 is a front view of the embodiment shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

On the supporting frame 1 of a spinning machine, a spinning unit 2 including a combing roller and a rotary suction spinning chamber is mounted. A yarn 3 is continuously spun of a roving 15 supplied from a supply reel 16 to the inlet of the spinning unit 2 and guided over a roller to the bight between two transported rollers 5 and 6. Transporting roller 5 is continuously driven, and drives transporting roller 6 which is in frictional contact with the same.

A shaft 70 supports the hub 71 of a supporting means 7 which has an arm 72 carrying a shaft portion 73 on which transporting roller 6 is mounted. In the normal operative position of the apparatus shown in the drawing, the weight of transporting roller 6 urges supporting means 72 to turn in counterclockwise direction so that transporting roller 6 engages the yarn and transporting roller 5. When supporting means 7 is turned in clockwise direction to a servicing position, transporting roller 6 is separated from transporting roller 5.

A container 10 is mounted by means of a bolt and nut 74 on arm 72 and has a lower end portion 10a into which a vertical tube 101 is inserted. Tube 101 and the lower end portion 10a form a cavity into which a stick of a processing substance 102 is inserted. Electric resistor heating means 11 are provided at the lower end of the cavity adjacent the lower end of stick 102, and melt the same. Tube 101 is preferably made of glass to permit observation of the last consumed part of the stick 102. The lower end of the cavity in container portion 10a has a lateral open end bounded by wall portions 103 on which the shaft 121 of an applicator roller 12 is mounted. Applicator roller 12 engages yarn 3 adjacent transporting roller 6, or directly abuts transporting roller 6 in the region where yarn 3 is located. The lower end of stick 102 rests on applicator roller 12 so that the same is fed with the melted substance when the electric heating means 104 operate.

Shaft 121 carries a gear 122 meshing with the gear 91 which is fixed to a shaft 8 carried by portion 10a of the container. Shaft 8 carries a friction roller 9 which is pressed by the weight of supporting means 7 against transporting roller 5 and rotated by the same so that the applicator roller 12 is continuously rotated for applying the melted substance 102 to the transported yarn 3. In the modification in which the applicator roller is in direct contact with transporting roller 6, the gear means 91, 122 and friction roller 9 may be omitted.

The lower container portion 10a has a bottom plate 104 provided with an adjustable gate plate 105 whose edge is parallel to the peripheral surface of applicator roller 12 and forms with the same a gap 13 which determines the thickness of the melted processing substance on applicator roller 12, so that the amount of the substance applied to the yarn can be adjusted.

During operations, the sliver or roving 15 is supplied to the spinning chamber and spun in the spinning unit 2 from which the yarn 3 is withdrawn by transporting rollers 5 and 6 and supplied to the winding apparatus including winding roller 14a and takeup roller 14. The lower end of the stick 102 consisting of the substance which is to be applied to the yarn 3, is melted by the heat produced by heating means 104, and the melted substance is transported by applicator roller 12 and applied to yarn 3 while the stick 102 is gradually consumed and continuously moves downward due to its weight.

While the thickness of the layer on the applicator roller 12 can be adjusted by adjustment of bottom plate 11, and gate plate 105 with edge 13, the amount of the substance applied to yarn 3 can also be controlled and varied by varying the viscosity of the melted substance which depends on its temperature. When the heat produced by the electric resistor heating means 11 is varied, the viscosity of the melted substance is also varied, which influences the amount of the substance applied to yarn 3.

In the event of a yarn breakage, supporting means 7 with transporting roller 6, container 10, 10a, and friction roller 9 are tilted upward so that transporting roller 6 is separated from transporting roller 5. The broken yarn end is inserted into channel 4 of the spinning chamber and sucked into the same so that it is again connected with the supply sliver 15, and spinning can be continued after the supporting means 7 has been turned back to its normal position.

It is also possible to feed yarn 3 between transporting rollers 5 and 6 due to a stop portion 61 on transporting roller 6 so that the yarn is laid about applicator roller 12.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of apparatus for applying a processing substance to a transported yarn differing from the types described above.

While the invention has been illustrated and described as embodied in an apparatus in which a melted substance is supplied by an applicator roller to the yarn transported out of a rotary spinning chamber by a pair of transporting rollers, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

I claim:

1. Apparatus for applying a processing substance to a transported yarn, comprising, in combination, yarn supply means; yarn takeup means above said yarn supplying means; a pair of yarn transporting rollers for transporting a yarn from said supply means to said takeup means along an upright path; supporting means; a container mounted on said supporting means over said transporting rollers and having a cavity for holding the processing substance, said cavity having a lower open end opposite said path of the transported yarn; and an applicator roller mounted on said container for rotation and being driven by one of said transporting rollers, said applicator roller being partly located at said lower open end of said cavity for receiving the substance, and partly engaging the yarn adjacent one of said transporting rollers for applying said substance to the same.

2. Apparatus as claimed in claim 1 wherein said yarn supply means include a spinning chamber located under said transporting rollers.

3. Apparatus as claimed in claim 1 wherein said container has an upper tubular portion forming the upper portion of said cavity so that a meltable stick of said substance can be placed in the same in a position in which the lower end thereof is located at said lower open end of said cavity adjacent said applicator roller; and comprising heating means at the lower end of said container for melting the lower end of said stick so that the melted part of the substance is deposited on said applicator roller and applied by the same to the yarn.

4. Apparatus as claimed in claim 3 wherein said container

comprises an adjustable bottom plate forming with said lower end portion of said container said lower open end of said cavity, said bottom plate having an edge extending along the peripheral surface of said applicator roller and forming a gap with the same so that the thickness of the layer of said substance received by said applicator roller is different in different adjusted positions of said bottom plate.

5. Apparatus as claimed in claim 3 wherein said heating means include electric heaters located at the lower end of said cavity; and wherein said applicator roller is positioned to support the lower end of said stick in the proximity of said electric heaters.

6. Apparatus as claimed in claim 1 wherein said supporting means include a shaft, and arm means mounted for angular movement on said shaft downward projecting from the same slanted to a vertical plane; wherein said one transporting roller is mounted for rotary movement at the end of said arm means; and wherein said container is mounted on said arm means between said one transporting roller and said shaft so that said one transporting roller, said container, and said applicator roller can be moved as a unit with said arm means about said shaft from a normal operative position in which said one transporting roller rests on the other transporting roller to a servicing position in which said one transporting roller is spaced from said other transporting roller.

7. Apparatus as claimed in claim 1 wherein said applicator roller is mounted on said container in a position in contact with the surface of said one transporting roller and with the yarn thereon and is driven from said one transporting roller.

8. Apparatus as claimed in claim 1 comprising an intermediate roller in contact with and driven by the other transporting roller; and gear means connecting said intermediate roller with said applicator roller so that the same rotates; and wherein said applicator roller is mounted on said container in a position spaced a small gap from said one transporting roller and engaging the yarn between the same and said takeup means.

9. Apparatus as claimed in claim 1 wherein said yarn supply means include a rotary suction spinning chamber located under said transporting rollers; wherein said container has an upper upright tubular portion forming the upper portion of said cavity so that a meltable stick of said substance can be placed in the same in a position in which the lower end thereof is located at said lower open end of said cavity adjacent said applicator roller; and comprising heating means at the lower end of said container for melting the lower end of said stick so that the melted part of the substance is deposited on said applicator roller and applied by the same to the yarn.

10. Apparatus as claimed in claim 9 wherein said container comprises an adjustable bottom plate forming with said lower end portion of said container said lower open end of said cavity, said bottom plate having an edge extending along the peripheral surface of said applicator roller and forming a gap with the same so that the thickness of the layer of said substance received by said applicator roller is different in different adjusted positions of said bottom plate; wherein said supporting means include a shaft, and arm means mounted for angular movement on said shaft downward projecting from the same slanted to a vertical plane; wherein said one transporting roller is mounted for rotary movement at the end of said arm means; and wherein said container is mounted on said arm means between said one transporting roller and said shaft so that said one transporting roller, said container, and said applicator roller can be moved as a unit with said arm means about said shaft from a normal operative position in which said one transporting roller rests on the other transporting roller to a servicing position in which said one transporting roller is spaced from said other transporting roller.