Sept. 10, 1968 K. NIMTZ ETAL 3,400,528

METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES

Filed Oct. 11, 1967 11 Sheets-Sheet 1

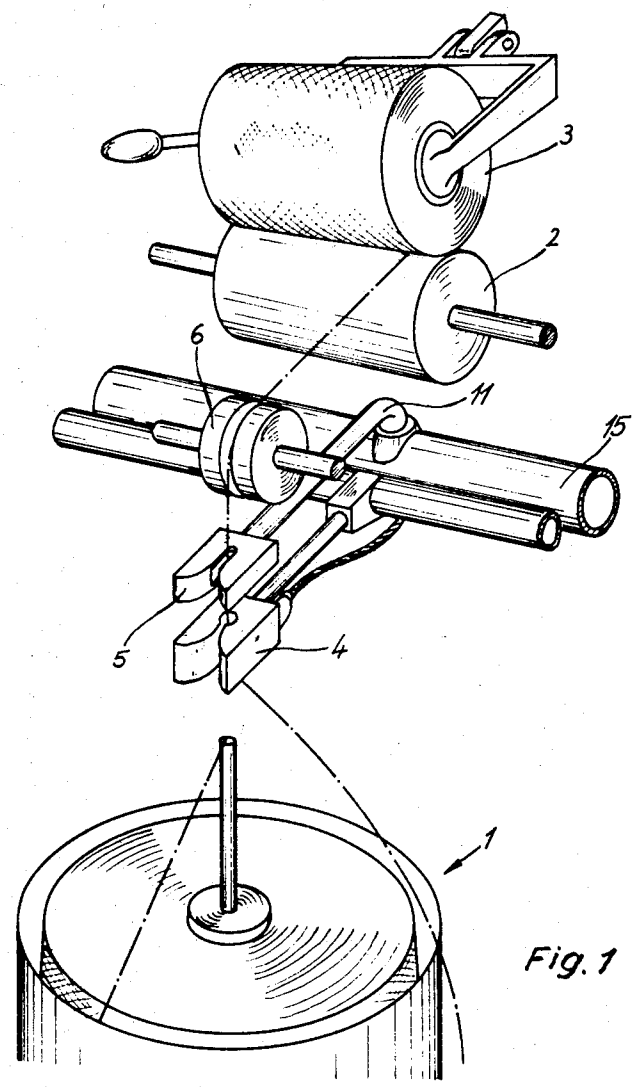


Fig. 1

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METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES
Filed Oct. 11, 1967 11 Sheets-Sheet 2

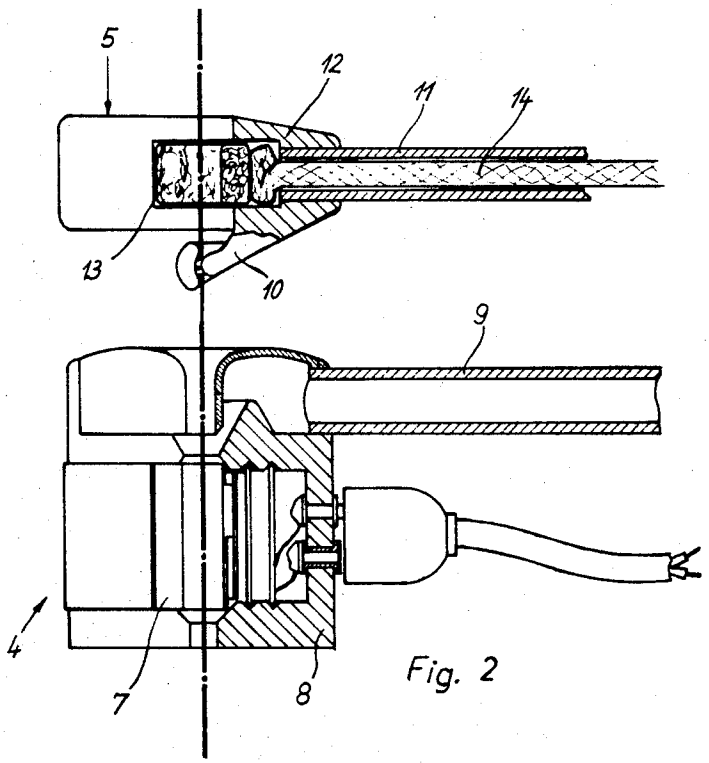


Fig. 2

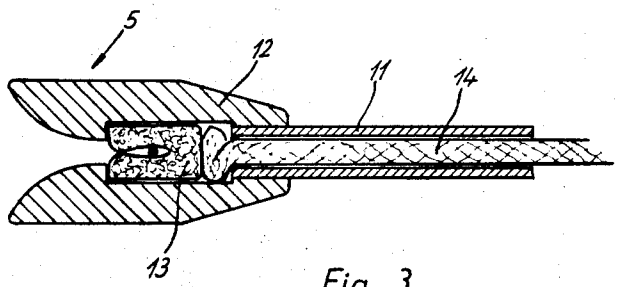


Fig. 3

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Sept. 10, 1968 K. NIMTZ ETAL 3,400,528

METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES

Filed Oct. 11, 1967 11 Sheets-Sheet 3

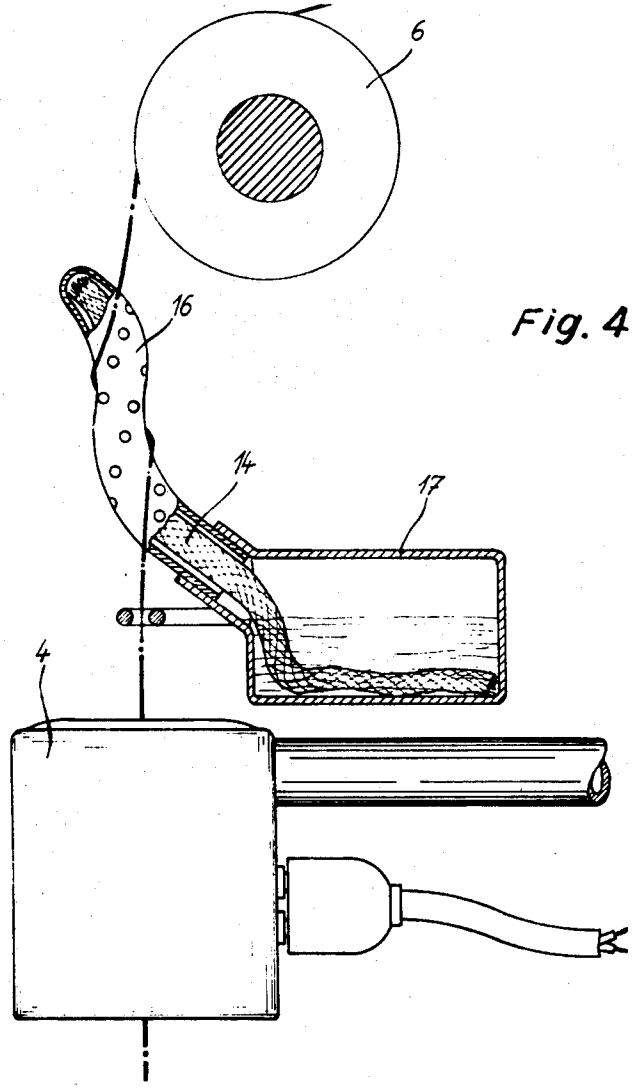


Fig. 4

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Sept. 10, 1968 K. NIMTZ ETAL 3,400,528

METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES

Filed Oct. 11, 1967 11 Sheets-Sheet 4

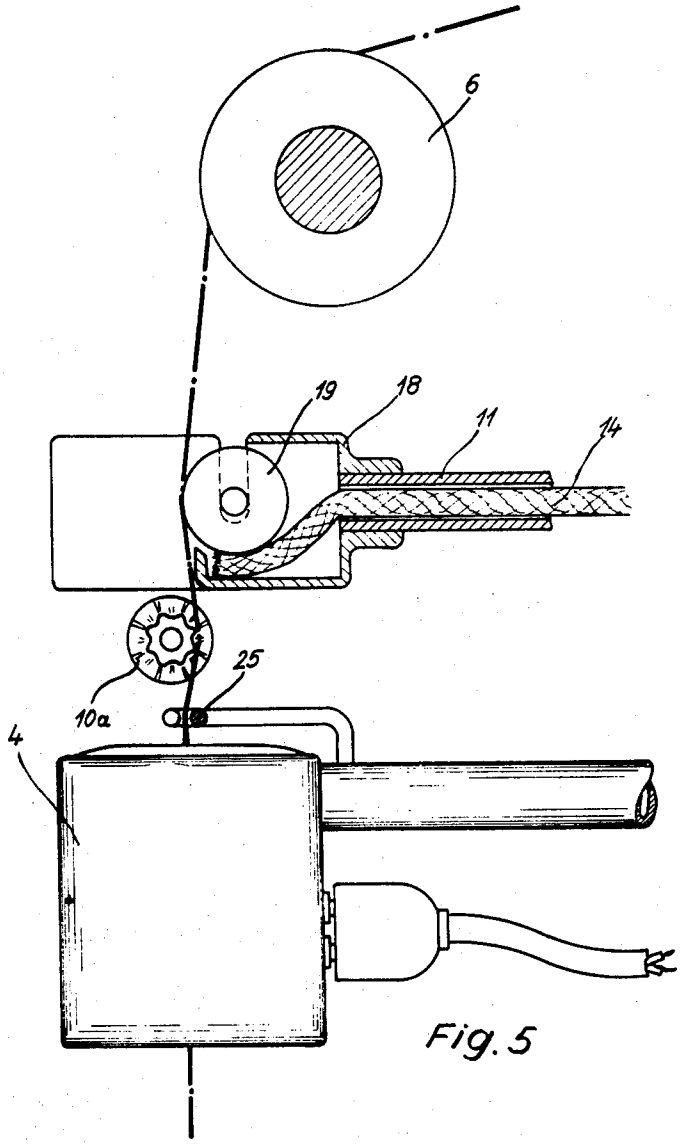


Fig. 5

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Sept. 10, 1968 K. NIMTZ ETAL 3,400,528
METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES
Filed Oct. 11, 1967 11 Sheets-Sheet 5

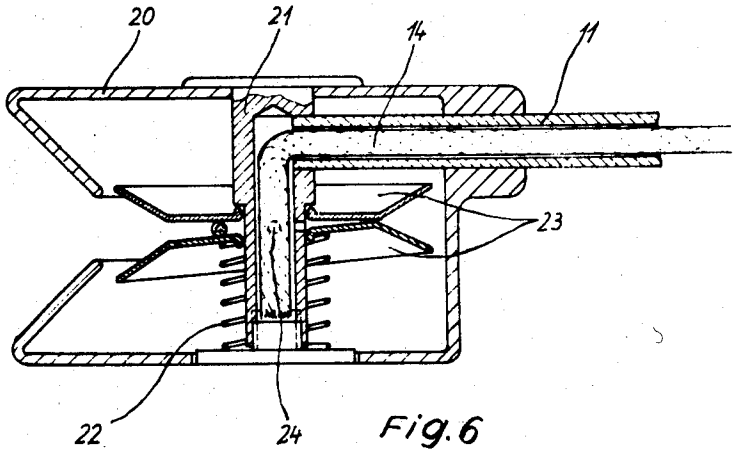


Fig. 6

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Sept. 10, 1968 K. NIMTZ ETAL 3,400,528
METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES
Filed Oct. 11, 1967 11 Sheets-Sheet 6

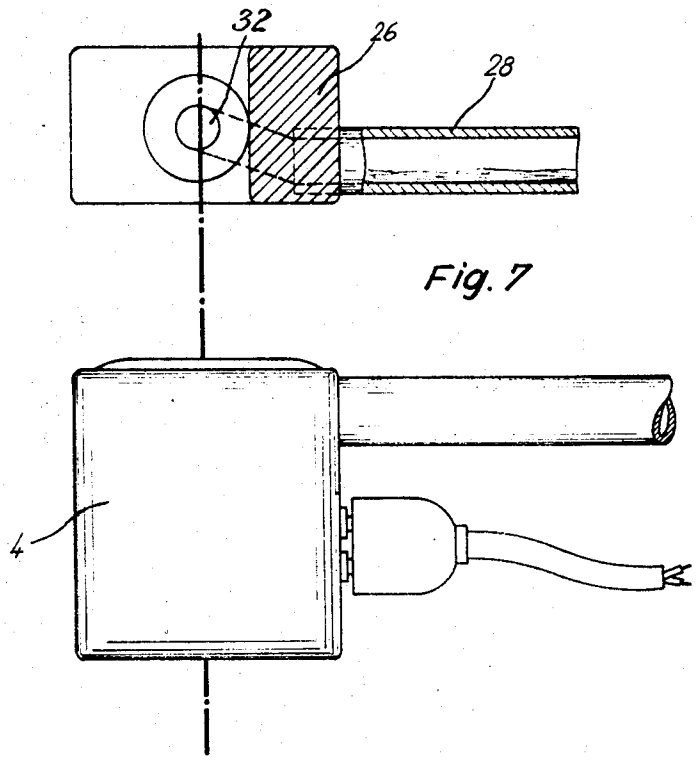
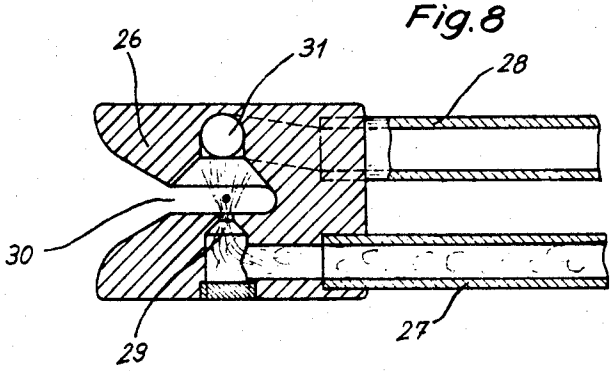


Fig. 7

Fig. 8



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Sept. 10, 1968 K. NIMTZ ETAL 3,400,528
METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES
Filed Oct. 11, 1967 11 Sheets-Sheet 7

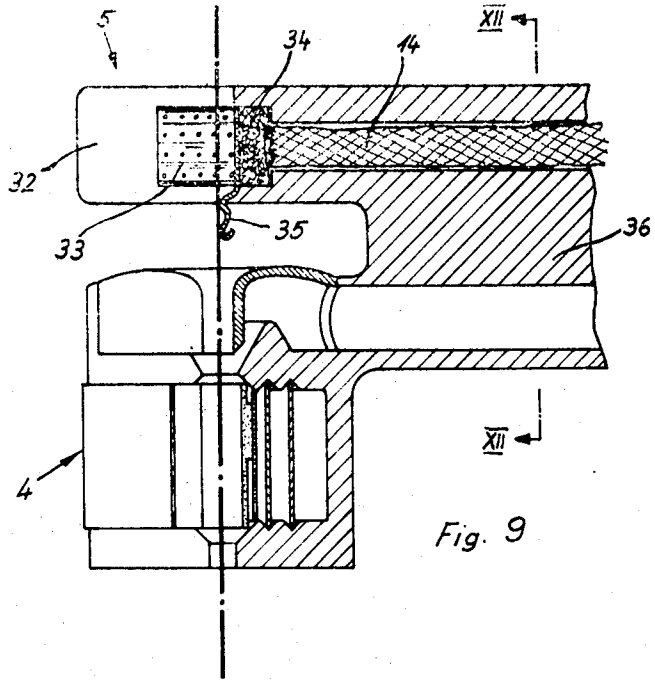


Fig. 9

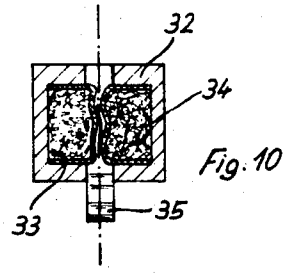


Fig. 10

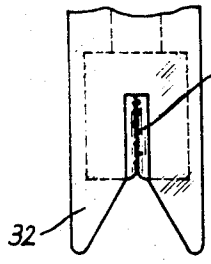


Fig. 11

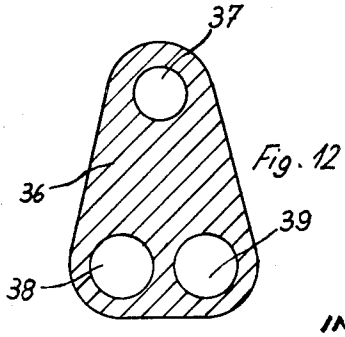


Fig. 12

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Sept. 10, 1968 K. NIMTZ ETAL 3,400,528
METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES
Filed Oct. 11, 1967 11 Sheets-Sheet 8

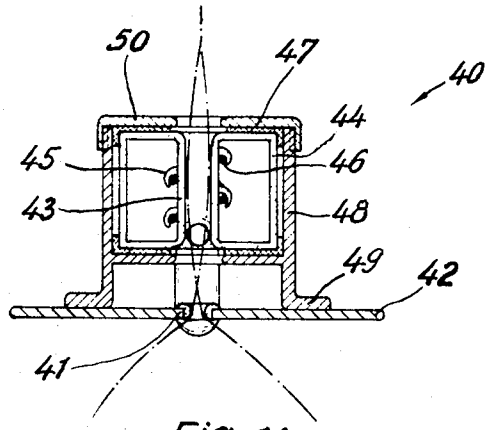


Fig. 14

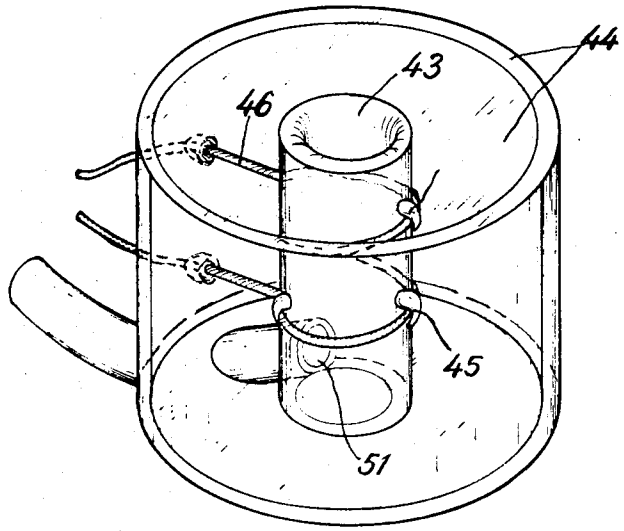


Fig. 13

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Sept. 10, 1968 K. NIMTZ ETAL 3,400,528
METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES
Filed Oct. 11, 1967 11 Sheets-Sheet 9

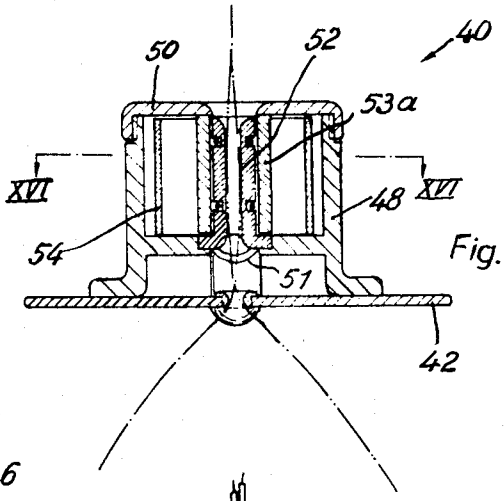


Fig. 15

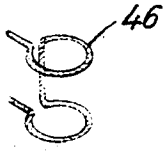


Fig. 17

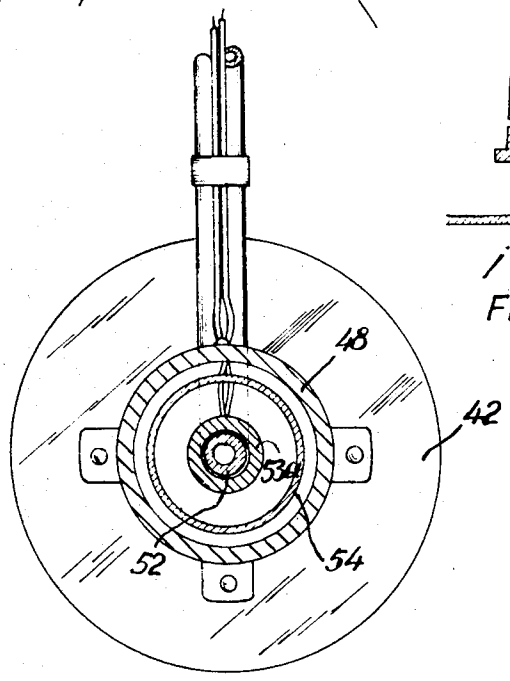


Fig. 16

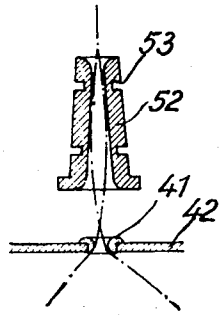


Fig. 18

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Sept. 10, 1968 K. NIMTZ ETAL 3,400,528
METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES
Filed Oct. 11, 1967 11 Sheets-Sheet 10

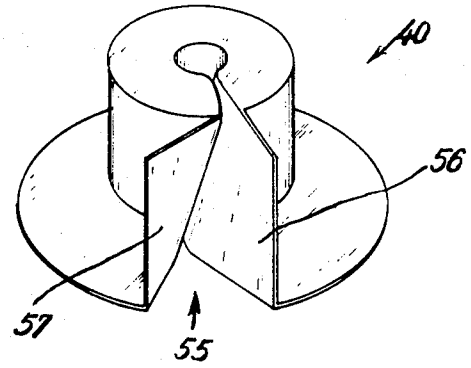


Fig. 19

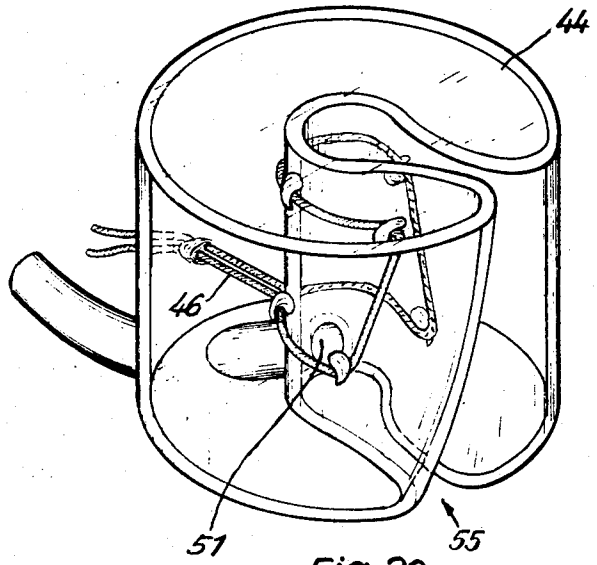


Fig. 20

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METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES

Filed Oct. 11, 1967 11 Sheets-Sheet 11

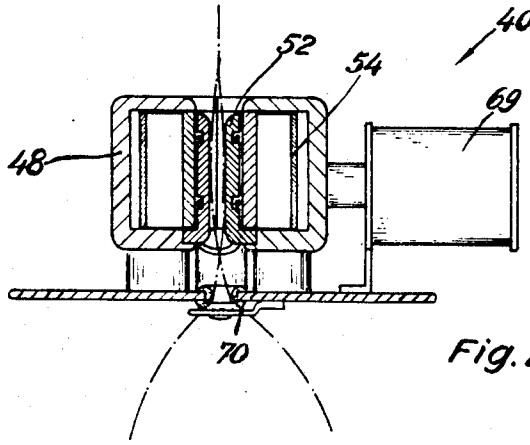


Fig. 21

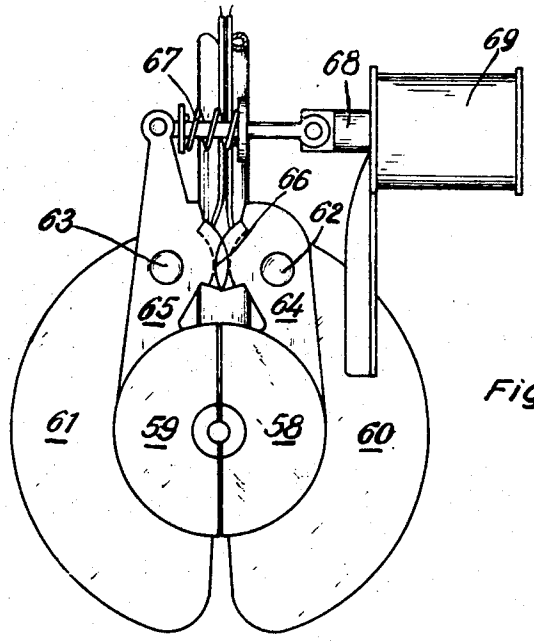


Fig. 22

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United States Patent Office 3,400,528 Patented Sept. 10, 1968

3,400,528

METHOD AND APPARATUS FOR POST-TREATING OF YARN ON TWO-FOR-ONE TWISTING MACHINES

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Filed Oct. 11, 1967, Ser. No. 674,474
Claims priority, application Germany, Mar. 25, 1967, P 41,729; Sept. 6, 1967, P 42,945
22 Claims. (Cl. 57—35)

ABSTRACT OF THE DISCLOSURE

The present invention concerns a method of and apparatus for post-treating yarn on two-for-one twisting machines according to which the yarn passes partially in the form of a thread balloon from a bobbin to a winding-up spool. The invention is characterized primarily in that the thread on its path from the tip of the thread balloon coming from said bobbin to said winding-up spool is singed while during the same operational step and on the same path the surface of the thread is moistened.

The present invention relates to a method of and apparatus for post-treating yarn, especially sewing threads, on two-for-one twisting machines.

In order to obtain as smooth a thread as possible, primarily two methods in connection with ring twisting machines are used. In this connection there is to be mentioned the so-called wet twisting according to which the thread prior to the start of the twisting operation is moistened or humidified so that fibers protruding from the thread are smoothened out with the thread so as to be located on the thread. On two-for-one twisting machines, however, it has heretofore been impossible to produce a sewing thread twist which will qualitatively be equivalent in every respect to wet twisted ring yarn.

The second method consists in singeing the finished ring twist during a post-spooling operation. The thread passes on its way to the winding-up bobbin through a singeing device in which fiber parts and foreign bodies adhering thereto are burned off. Recently it has become possible with electrically heated singeing devices for the first time to obtain technically and economically fully satisfactory results also on two-for-one twisting machines. However, a certain drawback still exists inasmuch as each singeing operation automatically withdraws moisture from the thread so that the expansion and tearing resistance does not fully correspond to the values which are realized with wet twisted ring twist.

It is, therefore, an object of the present invention to provide a method and apparatus which will overcome the above mentioned drawbacks.

It is a further object of this invention to provide a method and apparatus for post-treating yarn or sewing thread which will result in a qualitatively better yarn than has been obtainable with the above mentioned methods alone, namely the wet twisting method alone, or the singeing method alone.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of an electrically heated singeing device and a moistening device in their cooperation with regard to a two-for-one twisting machine.

FIG. 2 shows the singeing device and moistening device according to FIG. 1 in side view and partially in section.

FIG. 3 represents a section through the moistening device according to FIG. 2.

FIG. 4 is a modified apparatus of a moistening device according to the invention.

FIG. 5 is a further embodiment of a moistening device with preceding singeing device.

FIG. 6 illustrates a section through a further embodiment of a moistening device.

FIG. 7 shows a moistening device for the feeding of steam with preceding singeing device.

FIG. 8 is a cross section through the moistening device of FIG. 7.

FIG. 9 is a section through a singeing and moistening device combined to a unit.

FIG. 10 is a cross section through the moistening device of the unit of FIG. 9.

FIG. 11 is a top view of the moistening device of FIGS. 9 and 10.

FIG. 12 is a section along the line XII—XII of FIG. 9.

FIG. 13 illustrates a hollow cylinder of quartz glass which is electrically heatable for singeing the thread passing therethrough.

FIG. 14 is a longitudinal section through a singeing device equipped with the hollow cylinder of FIG. 13.

FIG. 15 is a longitudinal section through a modified singeing device.

FIG. 16 represents a section along the line XVI—XVI of FIG. 15.

FIG. 17 is a perspective illustration of a heating coil surrounding the hollow cylinder.

FIG. 18 illustrates a conical hollow cylinder with thread guiding eye arranged on the entrance side for the thread.

FIG. 19 is a perspective view of a singeing device with widening thread insertion slot.

FIG. 20 is a perspective view of a hollow cylinder of quartz glass with a helical thread insertion slot.

FIG. 21 is a longitudinal section through a singeing device which is adapted to be unfolded in longitudinal direction.

FIG. 22 is a top view of the singeing device according to FIG. 21.

The method for post-treating yarn on two-for-one twisting machines is characterized primarily in that the thread on its way from the tip of the thread balloon to the winding-up bobbin is singed and during the same operation is moistened by wiping its surface.

Due to the fact that the yarn is subjected to singeing and at the same time has its surface moistened by wiping, a surprising improvement in quality is realized. By wiping the surface, also minute residues are removed which adhere to the yarn following the singeing operation. In view of the moistening effected during the same working operation, this method will, in case sewing thread is involved, realize particularly important advantages, namely the reduction in the expansion and the increase in tear resistance. The thread regains its moisture which was lost during the twisting and singeing operation, a fact which

advantageously affects the quality and makes itself advantageously felt during the subsequent working processes. In conformity with the invention, the moistening of the thread may be effected by the admission of liquid.

According to the invention it is also possible to effect the moistening of the thread by steam.

The apparatus for carrying out the method according to the invention is characterized primarily in that a singeing device has associated therewith a moistening device provided with a wiper for moistening the thread. As a result thereof, the above mentioned advantages are realized.

According to one embodiment of the invention, the mostening device may comprise a housing connected to a pipe which housing is provided with a wiper while in said housing a preferably driven roller is rotatably journalled. Preferably, within said pipe, there is provided a wick for feeding liquid and leading from below to the roller over which the thread passes. The wick will convey the absorbed liquid to the roller which in its turn passes the liquid onto the thread.

According to another embodiment of the invention, the moistening device may comprise a corkscrew-like hollow mandrel which receives the wick and consists of perforated or porous material around which mandrel the thread leaving the singeing device is wound. Also with this embodiment, a satisfactory moistening is obtained by the liquid which leaves the perforated or porous material.

According to the invention, the moistening device may also consist of a longitudinally slotted housing with likewise longitudinally slotted moisture absorbing insert while the wick in the pipe extends to the insert. The moisture absorbing insert through the slot of which the thread is passed has on all sides contact with the thread and brings about a good humidification of the thread.

According to a further embodiment of the invention, the housing of the moistening device has arranged therein a hollow stud on which a composite thread roller is rotatably journalled while the symmetric roller sections under the thrust of a spring engage each other and therebetween receive the thread coming from the singeing device. The wick is introduced into the hollow stud, and the said stud is in the plane of the thread passage provided with perforations or openings. Due to the fact that the liquid is not delivered from the outside but from the interior of the hollow stud, it will due to the centrifugal force pass between the sections of the thread roller onto the thread which in this way will be thoroughly moistened.

According to a further embodiment of the invention, the moistening device may comprise a head piece with a longitudinal slot passed through by the thread while transverse to the thread path an exit nozzle leads into said longitudinal slot for conveying saturated or unsaturated steam fed through a pipe. Opposite said nozzle there is located a funnel-shaped widening exit passage for the steam withdrawn through a second pipe. The moistening of the thread by steam has the advantage that the thread will not only be well moistened but at the same time will also be set. In order to make sure that during the singeing operation not only the fiber tips protruding from the thread will be singed but that also residues caused by the singeing process will be completely burned, the singeing device may be equipped with a hollow cylinder arranged above the zenith point of the thread balloon and passed through by the thread. This hollow cylinder may consist of one or more sections and may be made of highly heat resistant material with a smooth inner mantle surface. The said hollow cylinder is heated by at least one heating wire on the outside of the hollow cylinder and is surrounded by a protective mantle of one or more sections. A gas feeding nozzle leads into the thread entrance or the hollow cylinder.

Inasmuch as the hollow cylinder surrounding the thread in slightly spaced relationship thereto consists of a highly heat resistant material and is adapted by means of the

said heating wire to be heated to a high temperature while being arranged above the zenith point of the thread balloon formed by the thread around the delivery bobbin where the thread forms a second but considerably smaller balloon, the thread will on its way through the heated hollow cylinder, due to its radially outwardly swinging movement about the axis of the cylinder body pass continuously along the inner mantle surface of the hollow cylinder. The contact on all sides of the thread with the heated inner mantle surface of the hollow cylinder brings about that in addition to the singeing of the protruding fiber tips the thread is smoothened in view of the thus obtained ironing effect. The realization of this effect requires that the fiber tips are burned completely and that no burned residues collect on the inner mantle surface of the hollow cylinder as a result of which the inner mantle surface would loose its smoothness so that also the singeing temperature could not be fully effective.

The gas feeding nozzle provided in accordance with the present invention through which the gases enter the thread entrance of the hollow cylinder for carrying out the singeing effect not only brings about that the required singeing temperature will be realized already at a relatively low electric output but also brings about that the residues remaining after a complete burning will be blown out of the hollow cylinder.

The hollow cylinder may consist of quartz glass or ceramic material or other materials which are particularly heat resistant and assure a smooth surface over a long period of time.

A high electric degree of efficiency can, in conformity with the invention, be realized by surrounding the hollow cylinder at least partially by a heat ray reflecting mirror surface arranged within the protective mantle.

A further important improvement may be realized by evacuating the hollow space between the hollow cylinder and the protective mantle. In this way a scaling of the heating coil will be prevented.

According to a further feature of the present invention, for purposes of screening the lint which ascends from the thread balloon, the hollow cylinder with the protective mantle may be fastened to a screening or shrouding plate which is provided with the thread guiding eye determining the zenith point of the thread balloon.

The smoothening of the thread, i.e. the circumferential ironing effect, can be increased according to the further development of the invention according to which the inside of the hollow cylinder is widened at the thread entrance side. This brings about that the thread will be smoothened not only at the level of the balloon section which has swung out radially to the greatest extent but also over a longer thread section.

For purposes of introducing the thread into the hollow cylinder with protective mantle, the said cylinder may, according to a further development of the invention, be provided with a longitudinally extending preferably helical thread insert slot. In view of the helical shape of the insert slot, a radial insertion of the thread is made possible while on the other hand it will be assured that the rotating thread will continuously engage a surface portion of the hollow cylinder and that the ironing effect will not be interrupted when the thread moves over the insert slot.

The insertion of the thread through the insert slot may, according to the invention, be further facilitated by arranging on both sides of said slot two radially outwardly extending thread guiding plates.

According to a further modification of the invention, the hollow cylinder with protective mantle may be longitudinally divided and the two sections may be so arranged that they can be folded away from each other. This embodiment has the advantage that at a standstill of the two-for-one twisting machine, the two sections of the singeing device can be folded away from each other in order to prevent an overheating and burning of the thread inasmuch as the heat emanated from the heating

surface will no longer be concentrated upon the thread. Furthermore, the supply of electric current during the standstill of the spindle does not have to be interrupted, aside from the fact that an interruption of the current alone would not suffice to sufficiently quickly bring about a satisfactory cooling. For purposes of obtaining an automatic folding away of the sections of the singeing device, the sections of the singeing device and/or the sections of the correspondingly divided screening plate may for folding the same have connected thereto the displacing armature of an electric magnet through the intervention of intermediate elements so that no manual operation will be necessary.

This electromagnet may, according to the present invention, be controllable in such a way that the singeing device will at a thread standstill automatically unfold and will automatically close when the thread starts moving again.

In conformity with the invention, the singeing device and the moistening device may be combined to a one-piece unit which as a unit can be connected to and disconnected from the machine frame.

Referring now to the drawings in detail and FIG. 1 thereof in particular, it will be noted that according to FIG. 1 the thread passes from the two-for-one twisting spindle generally designated **1** in upward direction to the winding-up bobbin **3** which is driven by the friction roller **2**.

Above the zenith point of the thread balloon there is provided an electrically heated singeing device **4** and directly thereabove there is arranged a moistening device **5**. The thread transport is additionally effected by the advancing roller **6** arranged above the moistening device **5**. The singeing device indicated in FIG. 1 may be of the type disclosed in U.S. patent application Willy Heimes Ser. No. 674,407 filed of even date herewith and entitled "Singeing Device for Threads," said U.S. application being based on German application No. P 42,613 of July 18, 1967. For carrying out the method according to the present invention, also other singeing devices may be employed, for instance as described further below in connection with FIGS. 13–22.

According to FIG. 2, above the singeing device **4** there is arranged a moistening device **5** provided with a wiper **10**. The wiper **10** comprises an inclined downwardly directed extension which is arranged on the housing of the moistening device **5** and which is provided with a slot curved in the direction of the thread passage. The thread is slightly deviated at least two times in the curved slot, and any residues which may still adhere to the thread will in this way reliably be wiped off.

As will be evident from FIG. 3, the moistening device **5** comprises a head piece **12** connected to a pipe **11** and provided with a moisture absorbing insert **13**. Head piece **12** and insert **13** are longitudinally slotted similar to the singeing device **4** for receiving the thread. The insert **13** will suck itself full with liquid conveyed through the wick **14** in the pipe **11** and then gives off said liquid to the thread. In conformity with FIG. 1, the pipe **11** is connected to the liquid feeding pipe **5** extending over the length of the machine.

FIG. 4 shows a modification according to which the wick **14** is arranged in a corkscrew-like wound hollow mandrel **16** of perforated or porous material while the thread spirally passes around said mandrel. The wick **14** sucks the liquid from a container **17** which similar to the arrangement of FIG. 1 may be formed by a continuous hollow rail. The liquid passes through the mandrel **16** of perforated or porous material to the thread.

With the embodiment according to FIG. 5 the lateral walls of the housing **18** of the moistening device are slotted for receiving the bearing stud of the roller **19**. The wick **14** in the pipe **11** ends below the roller **19** and conveys its liquid to said roller **19** which in its turn moistens the thread passing thereover. Preferably, the roller **19** is driven, for instance by a driving belt or the like by the advancing roller **6**.

Under certain circumstances it may be advantageous to omit the wick **14** completely and to pass the thread over a roller **19** and a further not illustrated roller in such a way that the thread moves through an immersing bath within the housing **18**.

According to FIG. 5, below the moistening device there is provided a different type of wiper. This wiper comprises a doctor roller **10***a*, i.e. a roller which is composed of two dish-shaped discs with undulated inner surfaces which exert a strong wiping effect upon the thread passing between the dish-shaped discs. The roller **10***a* additionally brings about that the thread is subjected to a certain deviation in its direction of movement which has a favorable effect upon the engagement of the thread with the roller **19**. Since the thread on the other hand has to pass centrally through the heating pipe of the singeing device **4**, a guiding eye **25** is arranged above the thread exit.

FIG. 6 shows a cross section through a further embodiment of the moistening device. In this instance a hollow axial stud **21** which carries a two-sectional thread roller is connected in the side walls of the longitudinally slotted housing **20**. The thread roller is composed of two roller sections **23** which are slightly pressed against each other by a spring **22** and between which the thread passes. The pipe **11** with the wick **14** leads from the side into the hollow stud **21**. The wick makes a bend at its entrance into the stud and then extends in the longitudinal direction of the latter. In the plane of the thread passage, the hollow stud **21** is provided with radial perforations **24** through which the liquid carried by wick **14** can escape. The liquid is due to the centrifugal force distributed between the roller sections and is conveyed to the thread passing between said roller sections.

FIGS. 7 and 8 illustrate a moistening device according to which the thread passes through a steam jet. The steam may be in the form of saturated or unsaturated steam. The device comprises the longitudinally slotted head piece **26** into which extends the steam feeding pipe **27** and the steam withdrawing pipe **28**. The steam admitted through pipe **27** passes into the nozzle **29** extending in a direction transverse to the thread passage and flows on all sides around the thread passing through the slot **30**. In the oppositely located slotted wall there is provided a funnel-shaped widening exit passage **31** which merges with the steam withdrawing pipe **28**. For discharging condensed water, the discharge passage **31** extends at an incline downwardly within the head piece **26** as clearly shown in FIG. 7.

When moistening the thread in a device according to FIGS. 7 and 8 by means of steam, the advantage is realized that the thread is not only moistened but simultaneously also set.

FIGS. 9–12 illustrate an embodiment in which the singeing device **4** and the moistening device **5** are combined to a structural unit which as a unit can be connected to the machine frame and can be also disconnected as a unit.

The moistening device **5** comprises a longitudinally slotted head piece **32** with a likewise longitudinally slotted insert **33** of perforated or porous material. As will be evident from FIG. 10, the longitudinal slot of the insert **33** is undulated in the direction of the thread passage so that the thread during its passage therethrough will be slightly deviated a plurality of times and in this way will be better humidified. The feeding of the liquid is similar to the embodiment of FIG. 2 effected by a wick **14** and a liquid absorbing insert **34** received by the porous or perforated insert **33**.

FIGS. 9 and 10 show a modification of a wiper. In this instance, there is provided an undulated strip **35** of metal or ceramic material which protrudes downwardly from the head piece **32** of the moistening device. The thread to be moistened passes prior to entering the undulated slot

of the insert 33 of the moistening device over the said strip 35.

FIG. 12 shows the compact structure of the singeing and moistening device combined to a single unit. In the solid housing 36 of the combined device or unit, the top portion comprises the passage 37 for receiving the wick 14 of the moistening device, whereas the lower portion of said housing comprises the two passages 38 and 39 for the supply of air and the supply of current to the singeing device 4 respectively.

All humidifying devices illustrated in the drawings may, in conformity with the thread to be treated, be provided with wipers 10, 35 according to FIGS. 2 and 9 respectively or with a doctor roller 10*a* in conformity with FIG. 5.

Instead of the singeing device mentioned in the above referred to Heimes application, also a singeing device may be used as disclosed in FIGS. 13–22.

The singeing device 40 illustrated in these figures is connected to the screening plate 42 which centrally receives the thread guiding eye 41.

The singeing device 40 comprises a hollow cylinder 43 of highly heat resistant material which cylinder is surrounded in spaced relationship by a protective mantle 44. The hollow cylinder 43 is heated by means of a heating wire 46 which is wound around the cylinder 43 and by means of hooks 45 is connected thereto. As will also be seen from the drawing, the hollow cylinder 43 is by means of its protective mantle 44 and through insulating plates 47 supported by the housing 48 which by means of its legs 49 is connected to the screening plate 42. Housing 48 has its top closed by a cover 50 threadedly connected to the housing 48.

The gas feeding nozzle 51 leads into the thread inlet end of the hollow cylinder 43. By means of said nozzle 51, additional combustion air or oxygen enriched air is blown in in order to realize a complete burning of the residues formed during the singeing operation. For purposes of concentrating the produced heat radially inwardly and for purposes of insulation toward the outside, the hollow chamber between the hollow cylinder 43 and the protective mantle 44 may be evacuated. This brings about that the heating coil will be protected against scaling. Furthermore, for purposes of concentrating the heat onto the thread passing through the hollow cylinder 43, the inner surface of the protective mantle 44 is provided with a mirror surface reflecting the heat rays.

When the thread which above the thread guiding eye 41 forms a second thread balloon passes through the hollow cylinder 43, it will engage the inner mantle surface of the hollow cylinder body. As a result thereof, when the hollow cylinder is heated, the protruding fiber tips are singed off, and on the other hand the thread will on its way around be ironed on the hollow cylinder 43. Consequently, the thread will all the way around be provided with a very smooth surface. The residues formed during the singeing operation will be unable, in view of the radial movement of the thread, to adhere to the inner mantle surface of the hollow cylinder 43 and will be whirled up and will together with the upwardly flowing burned gases coming from the gas feeding nozzle 51 leave the singeing device together with the thread so that the residues will be completely burned.

FIGS. 15 to 18 illustrate a modified singeing device. The primary difference over the preceding embodiment consists in that the hollow cylinder is not of quartz glass but of a ceramic material. The hollow cylinder 52 has its lower angled off marginal portion resting on the bottom of the housing 48. The outer surface of the hollow cylinder 52 is provided with grooves 53 for receiving the heating coil 46 which is bent in order to conform to the grooves 53. The housing 48 is closed at its top by a cover 50 while the marginal portion of the central thread exit opening rests on the spacer pipe 53*a* the lower end of which rests on the angled-off marginal portion of the hollow cylinder 52. In this way the hollow cylinder 52 is by means of the cover 50 and the spacer pipe 53*a* safely held by the housing 48 of the singeing device.

Also with this embodiment the gas feeding nozzle 51 leads into the thread inlet end of the hollow cylinder 52. As will be evident from FIG. 16, the hollow cylinder is all the way around within the housing 48 representing the protective mantle surrounded by a heat reflecting mirror 54 which brings about that a high temperature can be maintained in the hollow cylinder 53 consisting of ceramic material.

FIG. 18 shows a further development of a hollow cylinder 52. This cylinder flares inwardly as well as outwardly in a conical manner toward the thread inlet end. If a hollow cylinder of this type is employed in a singenig device, the ironing effect is not limited to that portion of the thread balloon which swings out farthest in radial direction but also acts upon the upwardly narrowing section. This has the advantage that the ironing effect will be effective on the thread over a longer period of time.

FIGS. 19 and 20 respectively illustrate singeing devices the protective mantle of which is provided with a longitudinally extending helical thread inlet slot 55. This embodiment brings about the advantage that at a standstill of the two-for-one twisting machine, the singeing device may remain heated because the thread can be pulled out of the device through the insert slot. Furthermore, the thread can be inserted into the device in a simple manner without an awkward threading by means of additional devices in conformity with FIGS. 14 to 18.

For purposes of facilitating the insertion of the thread, the device according to FIG. 19 is at both sides of the thread insert slot 55 provided with two radially outwardly extending thread guiding plates 56 and 57.

The hollow cylinder of FIG. 20 which is likewise made of quartz glass is produced by depressing a portion of the wall of a cylindrical quartz glass ring. Also in this instance the gas feeding nozzle 51 leads into the thread inlet end of the hollow cylinder. Moreover, the inside of the protective mantle 44, for purposes of producing a better electric degree of efficiency of the heating wire 46 surrounding the hollow cylinder, may be provided with a heat reflecting mirror layer, and the hollow space in the interior of the quartz glass ring may be evacuated. This brings about the additional advantage that the heating coil will not scale.

FIGS. 21 and 22 illustrate an embodiment with a singeing device divided into two sections. The details of this singeing device correspond to those of the embodiment of FIGS. 15 and 16, however, the two sections 58 and 59 can be opened up about bolts 62 and 63 extending parallel to the axis of the hollow cylinder, whereas the screening plate 60, 61 is provided with a threading slot. At the bottom of the screening plate 60, 61 there is provided a hook 70 which closes the threading slot of the thread guiding eye 41. The interengaging gear ring segments 66 extend about the bolts 62 and 63 along a partial arc and form a portion of the tilting yokes 64 and 65. The free end of yoke 65 is through a pressure spring 67 connected to the extension of the displaceable armature 68 of an electromagnet 69 supported by the screening plate. When yoke 65 in view of a displacement of the armature 68 of the electromagnet 69 is tilted, the two sections of the singeing device are either opened up or closed again. The opening and closing of the device may be controlled in conformity with the thread passage. Consequently, with this embodiment, it can be realized in a simple manner that the singeing device will at a standstill of the thread automatically be opened up and will auomatically be closed when the thread starts to move again.

The singeing device according to FIGS. 21 and 22 does not require a special insert slot for the thread. The ironing effect is made possible over the entire hollow cylinder. No danger exists that at an undesired standstill of the spindles the thread will burn within the singeing device.

The supply of electric current does not have to be interrupted when the sections are open so that the device is again operative when the singeing device will be closed at the time the spindles move again.

It is, of course, to be understood that the present invention is, by no means, limited to the particular embodiments disclosed in the drawings but also comprises any modifications within the scope of the appended claims.

What we claim is:

1. A method of post-treating yarn on two-for-one twisting machines according to which the yarn passes partially in the form of a thread balloon from a bobbin to a winding-up spool, which includes the steps of: singeing the thread on its path from the tip of the thread balloon coming from said bobbin to the winding-up spool while during the same operational step and on said path moistening the surface of the thread.

2. A method according to claim 1, in which the moistening is carried out by the application of liquid to the yarn.

3. A method according to claim 1, in which the moistening is carried out by the application of steam to the yarn.

4. In connection with a two-for-one twisting machine having bobbin holder means for receiving a bobbin, an apparatus for post-treating yarn being withdrawn from a bobbin on said bobbin holder means, which includes: a winding-up spool for receiving yarn being withdrawn from a bobbin on said bobbin holder means, singeing means interposed between said bobbin holder means and said winding-up spool, and moistening means associated with said singeing means and likewise arranged between said bobbin holder means and said winding-up spool for moistening a yarn on its way from a bobbin on said bobbin holder means to said winding-up spool.

5. An apparatus according to claim 4, in which said moistening means comprises: housing means, wiper means associated with said housing means, roller means rotatably mounted in said housing means and adapted to be passed over by a yarn passing from a bobbin on said bobbin holder means to said winding-up spool, and fluid conveying means for conveying fluid to said roller means.

6. An apparatus according to claim 4, in which said moistening means comprises: hollow mandrel means wound in a corkscrew-shaped manner and adapted to be passed over by a yarn being withdrawn from a bobbin on said bobbin holder means on its way to said winding-up spool, and wick means extending into said hollow mandrel means for conveying fluid thereinto, said mandrel means being provided with passage means extending from the inside to the outside over a surface over which a yarn being withdrawn from a bobbin on said bobbin holder means has to pass to said winding-up spool.

7. An apparatus according to claim 4, in which said moistening means comprises: housing means having a longitudinal slot, insert means likewise provided with a longitudinal slot in substantial alignment with said first mentioned slot and adapted to absorb and store fluid, and wick means adapted to convey fluid and extending to said insert means for conveying fluid thereto.

8. An apparatus according to claim 4, in which said moistening means comprises: housing means, hollow stud means arranged within said housing means, yarn guiding roller means rotatably journalled on said stud means, said roller means comprising two roller sections continuously yieldably pressed against each other for receiving and passing a yarn therebetween passing from said singeing means to said winding-up spool, and wick means extending into said hollow stud means for conveying fluid thereto, said hollow stud means being provided with passage means within the area of said two-sectional roller means for conveying fluid between said two sections.

9. An apparatus according to claim 4, in which said moistening means comprises: a head piece having a slot for guiding therethrough a yarn being withdrawn from a bobbin on said bobbin holder means and being passed to said winding-up spool, nozzle means mounted in said head piece and having a mouth adjacent one side of said slot for injecting fluid into said slot in a direction transverse thereto, said head piece being provided with an exit passage at the other side of said slot opposite said nozzle mouth and flaring in the direction toward said nozzle mouth, wick means leading to said nozzle means for conveying fluid thereto, and discharge conduit means communicating with said exit passage.

10. An apparatus according to claim 4, in which said singing means comprises: a hollow cylinder of highly heat resistant material with an inner mantle surface for conveying a yarn to be singed therethrough, heating wire means surrounding said hollow cylinder for heating the same, and protective mantle means surrounding said hollow cylinder in spaced relationship thereto, and gas conveying nozzle means leading into said hollow cylinder at that side thereof which is adjacent said bobbin holder means.

11. An apparatus according to claim 10, in which said hollow cylinder consists of quartz glass.

12. An apparatus according to claim 10, in which said hollow cylinder consists of ceramic material.

13. An apparatus according to claim 10, in which the inner surface of said protective mantle means includes a mirror surface adapted to reflect heat rays.

14. An apparatus according to claim 10, which includes means for evacuating the space between said hollow cylinder and said protective mantle means.

15. An apparatus according to claim 10, which includes screen plate means supporting said hollow cylinder and said protective mantle means, and a thread guiding eye connected to said screen plate means for receiving and passing therebetween a yarn being withdrawn from a bobbin on said bobbin holder means to thereby determined the zenith point of the thread balloon formed by the yarn being withdrawn from a bobbin on said bobbin holder means.

16. An apparatus according to claim 10, in which said hollow cylinder has a yarn inlet and a yarn outlet, and in which the interior of said hollow cylinder flares toward said yarn inlet.

17. An apparatus according to claim 10, in which said hollow cylinder and said protective mantle means are provided with longitudinally extending helical thread insert slot means.

18. An apparatus according to claim 17, which includes thread guiding plate means extending outward from opposite sides of said thread insert slot means.

19. An apparatus according to claim 10, in which said hollow cylinder and said protective mantle means are longitudinally divided into sections operable selectively to be moved toward and away from each other.

20. An apparatus according to claim 19, which includes electromagnet means and link means interconnecting said electromagnet means and said sections of said hollow cylinder and said protective mantle means for actuating the same.

21. An apparatus according to claim 20, which includes control means operatively connected to said electromagnet means and operable in response to a standstill of a yarn in said hollow cylinder automatically to space said sections of said hollow cylinder and said protective mantle means from each other to permit removal of said yarn, said control means also being operable in response to the start of movement of a yarn through said hollow cylinder automatically to move said sections of said hollow cylinder and said protective mantle means toward each other to close said sections.

22. An apparatus according to claim 4, in which said singeing means and said moistening means form a single entity with each other.

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11

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