Oct. 23, 1962 S. FÜRST 3,059,865

APPARATUS FOR READYING THE THREAD COMING FROM A SUPPLY COIL IN REWINDING MACHINES

Filed Dec. 23, 1957

FIG. 1

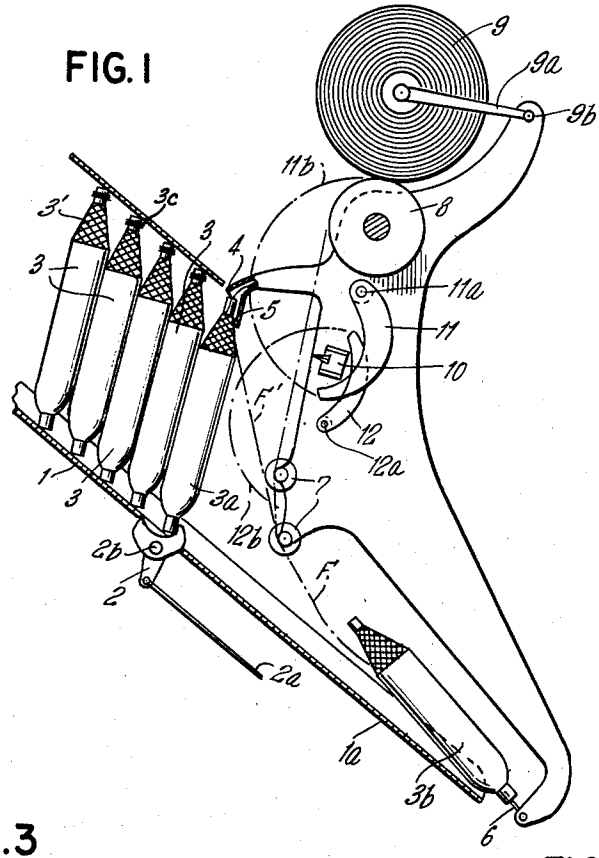


FIG. 3

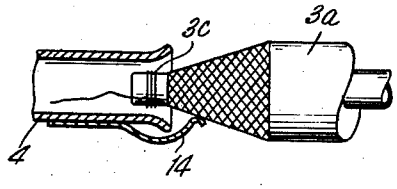


FIG. 4

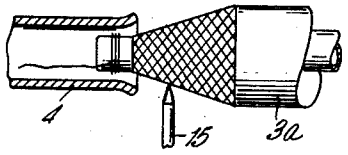
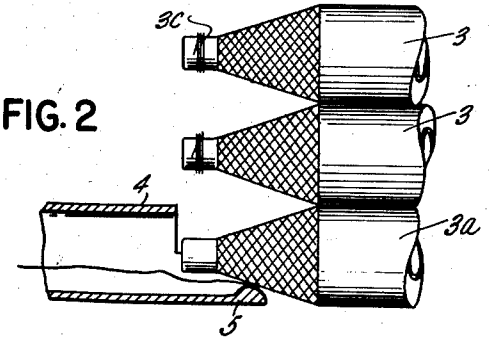


FIG. 2



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3,059,865

APPARATUS FOR READYING THE THREAD COMING FROM A SUPPLY COIL IN REWINDING MACHINES

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5 Claims. (Cl. 242—35.6)

My invention relates to a method and apparatus for preparing a wound package of textile thread, such as a spinning cop, for re-winding of the thread in a winding machine.

When the thread of supply coils is rewound from cops or other yarn packages provided with conical thread layers, it is often preferable to pull off the starting portion of the thread in order to make it freely accessible, before placing the cop in unwinding position in the winding machine. Such a method and apparatus are shown and described in the copending patent application of W. Reiners and S. Fürst, Serial No. 640,166 filed February 14, 1957, now U.S. Patent 2,936,130. In such devices however an excessive length of yarn may be pulled off the cop, particularly when carried out by air suction. The invention is advantageously applicable in conjunction with the method and devices described in the said patent application, although the invention is not limited to this particular manner of use.

An object of the present invention is to limit the pulled-off length of thread to a predetermined desired amount.

The invention, in one aspect, comprises the pulling-off of the yarn over the head of a supply coil having conical thread layers, particularly with the aid of an air current, the run-off of the conical thread layers being limited by means of a structure that is placed in contact with the supply coil along its conical portion.

According to another feature of the invention, a thread pull-off device is disposed in front of the tapering end of the conical coil portion, and a contact body is located at or near the pull-off device so as to touch the uppermost thread layer or to penetrate into the layer, the contact pressure exerted by the contact body on the conical thread layer being such that the pulling force imposed upon the thread by the pull-off device can only remove a limited length of thread. This limited length comprises that part of the top layer located in front of the point of engagement of the contact body.

According to still another feature of the invention, the contact pressure just mentioned is provided by the weight of the supply coil itself. For this purpose, either a fraction of the weight of an individual cop is utilized, or a multiple of the cop weight, particularly when using a magazine which accommodates a multiplicity of supply coils.

According to still another feature of my invention, a suction tube and a contact body are placed in the immediate vicinity of a supply-coil magazine, namely at the location of that supply coil which is to be issued next from the magazine. That is, the pulling-off of the thread from the supply coil takes place within the magazine itself. As a result, when the coil is discharged from the magazine toward the unwinding position in the winding machine, the thread is already in the position required for securing a proper gripping thereof by the thread-tying devices of the machine. It is particularly advantageous to mount the contact body on the suction tube itself or to make it an integral part of the tube.

These objects and features of my invention will be apparent from the preferred embodiment illustrated in the accompanying drawing, in which:

FIG. 1 is a schematic side view of an automatically or manually controlled coil winding machine showing the components that perform the re-winding operation, by passing the thread unwound from a supply coil onto a take-up spool;

FIG. 2 illustrates on larger scale a detail of a magazine applicable in such machines but modified in comparison with the magazine shown in FIG. 1; and

FIGS. 3 and 4 illustrate schematically two other modifications of the suction and contact devices acting upon the supply coil.

As shown in FIG. 1, the machine is provided with a magazine 1 which accommodates a number of supply coils here consisting of spinning cops which have a conical portion 3' at the end last wound. The lowermost cop 3*a* in the magazine has its conical end located opposite a suction tube 4 which is provided with a contact body 5 formed thereon. The cop 3*a* has its uppermost layer of thread, located in the conical portion 3', resting against the contact body 5, so that the contact pressure between the cop and body 5 is due to part of the weight of cop 3*a* augmented by part of the weight of the cops 3 located in the magazine above the lowermost cop.

The suction tube 4 is connected with a suction-pressure producer (not illustrated). The magazine is provided with a lock 2 which, when automatically or manually reciprocated by a connecting rod 2*a*, reciprocates about its pivot 2*b* and thus releases the lowermost cop 3*a* while retaining all other cops in the magazine. When so released the cop 3*a* drops along a slideway 1*a* into the unwinding position 3*b* where it is speared up and held on an automatically or manually pivoted mandrel 6. The yarn F then runs over two thread brakes 7, and a rotating thread guide 8, onto the take-up spool 9. The rotating thread guide 8 is driven, preferably at constant speed, and engages the periphery of the body of yarn wound up on spool 9 thus imparting a substantially constant peripheral speed to the spool, while simultaneously reciprocating the thread F along the spool in a direction parallel to the spool axis. The spool is revolvably mounted on a carrier 9*a* which is pivoted to the machine structure at 9*b* so that the spool is biased against the driving thread guide 8 by the weight of the spool and the weight of the holder 9*a*.

Located between the two thread brakes and the thread guide 8 is an automatic tying device 10 which cooperates with two feeder arms 11 and 12 which seize and convey the respective thread ends, of the supply cop 3*b* and of the take-up spool 9, to the tying device 10 where these thread ends are knotted together, whereafter the winding operation is started or continued as the case may be. The two feeder arms 11 and 12 are pivotally mounted on the machine structure at 11*a* and 12*a* respectively. Each of arms 11 and 12 is essentially a suction tube of arcuate shape having a suction nozzle located at the end of the arm, the suction pressure being supplied through the hollow pivots at 11*a* and 12*a* from the same source of suction pressure that is connected with the stationary or stationed suction tube 4. In the event of thread break, or when a supply cop is exhausted and a new cop 3*b* is inserted into the machine, the take-up spool 9 is temporarily driven in reverse direction and the suction tube 11 returns clockwise along the circular path denoted by 11*b* until the suction nozzle at the tip of tube 11 is close to the take-up spool 9 and pulls the thread end into the interior of the tubular arm 11. Thereafter the arm 11 turns back into the illustrated position and thus places the thread end from spool 9 in front of the tying device 10. During the same operation the arm 12 turns counterclockwise along the circular path denoted by 12*b*, seizes the thread end coming from the cop 3*b* and then returns to the illustrated position so that this thread end is like-

wise located in front of the tying device, which now acts to knot the two thread ends together before the winding operation commences or continues. This sequence of operations is readily accomplished manually, or preferably automatically; for example, by reversing gears and a multiple cam arrangement of the type described in Serial No. 640,166, now U.S. Patent 2,936,130.

In the embodiment shown in FIG. 2, which is otherwise similar to that according to FIG. 1, the supply coils in the magazine are located horizontally so that more of the weight of these cops is effective to produce contact pressure between the cop and the contact body 5.

In the modifications shown in FIGS. 3 and 4, the nozzle of suction tube 4 is placed closer to or closer about the conical layer of thread on the cop than is the case in the embodiment of FIG. 1 or FIG. 2. In FIG. 3 the contact body engaging the conical layer portion of the cop 3*a* is formed by an additional element, namely a leaf spring 14 which is fastened to the suction tube 4. In the embodiment of FIG. 4 a pointed body 15, a pin for example, is provided, which pin partly penetrates into the uppermost layer of thread on the cop.

When operation of the device is initiated, the cop 3*a* next to be issued from the magazine is first placed, or positioned, opposite the suction tube 4. The suction in tube 4 then acts upon the few turns of a reserve winding 3*c* provided upon the tip of the cop core. The suction removes the reserve winding, pulling and winding the thread end off the core tip. Then, when the thread is sucked into the interior of the tube 4, the suction pulls one or a number of turns off the uppermost layer of the main body of the thread. This continues until the thread runs against the contact body 5. The contact body 5 then prevents the pulling off of any more turns of the yarn. During exchange of a supply cop, the yarn end remains in the suction tube 4 while the cop 3*a* passes to the unwinding position 3*b*. Consequently the thread now occupies the position shown at F' where it extends from the nozzle opening of tube 4 over the lower thread brake. The thread is thus located in the active suction range of the arm 12 when the latter turns downward, as described in the foregoing.

This invention is applicable not only to machines employing stationary winding stations but also to the types of multiple rotary winding station machines described in copending applications Serial No. 675,758 and Serial No. 675,677, filed August 1, 1957, both now abandoned.

The scope of this invention includes modifications of the embodiments shown within the terms, meaning, and intent of the claims annexed.

I claim:

1. An apparatus for rewinding a textile thread from a conically wound supply coil onto a rotatable spool, comprising means for carrying out a joining operation to join the thread wound on the spool to the thread of the supply coil, said supply coil having a reserve winding attached to the main body of thread on said coil and wound around the tip of said coil, said means including suction tube means for pulling off a thread end portion from said reserve winding on the supply coil in the axial direction of the coil, over the end of the coil, contact means mechanically joined with and extending forwardly of said suction tube means in a radially inward direction so as to bear against the thread on the coil at a point a distance removed from said tip and with sufficient force to limit the length of thread pulled off by said suction tube means, means for positioning the coil carrying said thread against which said contact means is bearing so that a component of the weight of said coil produces at least part of said force, the engaging pressure of the contact means being such that the thread cannot be pulled off beyond the point of engagement during such engagement.

2. An apparatus for rewinding a textile filament from a conically wound cop onto a rotatable spool, comprising a filament tying device, means to return a filament end from the spool toward the filament tying device, means to receive a filament carrying cop and to support it while the filament is unwound therefrom onto the spool, a magazine to position a number of filament carrying cops, means to supply one of said cops from the magazine to the receiving means, stationed suction tube means positionable in a predetermined location to suck and remove a filament end from said one cop before placing the cop in unwinding position in the apparatus, said cop having a reserve winding attached to the main body of thread thereon and wound around the tip of said cop, contact means mechanically joined with and extending forwardly of said suction tube means in a radially inward direction so as to bear against the uppermost conically wound layer of filament on said one cop, at a point adjacent to but somewhat removed from said tip to limit during the bearing engagement of said contact means the length of filament end removed by the stationed suction tube means, the engaging pressure of said contact means against said filament being such that the filament cannot be withdrawn by said suction tube means beyond the point of engagement, the stationed suction tube means being adapted to ready the removed filament end for a subsequent tying operation, and means to find the filament then in the ready position and to move it toward the tying device, said magazine being so shaped and positioned relative to said contact means when said suction tube means is at said predetermined location such that the weight of at least said one cop provides at least a portion of said engaging pressure.

3. An apparatus for rewinding a textile filament from a cop having conical thread layers onto a rotatable spool, comprising a rotatable filament guiding element adjacent the spool, the turning of the guiding element also turning the spool, a filament tying device, the direction of rotation of the guiding element being reverisble, to return a filament end, movable suction applying means to suck a filament end so returned and to move the said filament end toward the filament tying device, means to receive a filament carrying cop and to support it while the filament is unwound therefrom onto the spool, a magazine to position a number of filament carrying cops, means to supply one of said cops from the magazine to the receiving means, suction tube means positionable at a predetermined location to suck and remove a filament end from the conical thread layers on said one cop positioned in the magazine, before placing the cop in unwinding position in the apparatus, said cop having a reserve winding attached to the main body of thread thereon and wound around the tip of said cop, contact means mechanically joined with and extending forwardly of said suction tube means in a radially inward direction so as to bear upon the filament on the last-wound conical layer of said one cop, at a point adjacent to but somewhat removed from said tip to limit during the bearing engagement of said contact means the length of filament and removed by the positioned suction means, the engaging pressure of said contact means against said filament being such that the filament cannot be withdrawn by said suction tube means beyond the point of engagement, the positioned suction means being adapted to ready the removed filament end for a subsequent tying operation, and second movable suction means movable into position to find the filament then in the ready position and to move it toward the tying device, said magazine comprising means for positioning said one cop against which said contact means is bearing so that a component of the weight of said one cop produces at least part of said force.

4. An apparatus for rewinding a textile filament from a conically wound cop onto a rotatable spool, comprising a rotatable filament guiding element adjacent the spool, the turning of the guiding element also turning the spool, a filament tying device, the direction of rotation of the guiding element being reversible to return a filament end,

movable suction applying means to suck a filament end so returned and to move the said filament end toward the filament tying device, means to receive a filament carrying cop and to support it while the filament is unwound therefrom onto the spool, said cop having a reserve winding attached to the main body of thread thereon and wound around the tip of said cop, a magazine to position a stack of filament carrying cops in an upwardly-downwardly extending position, means to supply one of said cops from the magazine to the receiving means, suction tube means positionable at a predetermined location to suck and remove an upper filament end from said reserve winding on said one cop while the latter is positioned in the magazine, before placing the cop in unwinding position in the apparatus, contact means mechanically joined with and extending forwardly of said suction tube means in a radially inward direction so as to bear against the filament on said one cop at a point adjacent to but somewhat below the upper filament end thereof being sucked off said tip and to limit the length of filament end removed therefrom by the positioned suction means, said magazine being so shaped and positioned relative to said contact means when said suction tube means is at said predetermined location such that part of the weight of the stack presses said one cop against the contact means, the positioned suction means readying the removed filament end for a subsequent tying operation, and second movable suction applying means movable into position to find the filament then in the ready position and to move it toward the tying device.

5. In an automatic machine for processing a textile filament taken from a filament-supplying conically wound coil stationed thereon, which coil is automatically replaced when depleted by a replenishing filament coil having a

starting end disposed in the form of turns on an end thereof, an automatic filament end tying device to tie said starting end to an end of the filament removed from the depleted coil, a suction nozzle positioned to seize and withdraw the starting end of the filament of the replenishing coil, means to ready said replenishing coil into position within range of the suction nozzle so that said starting end may be so seized, means to move the replenishing filament coil and its seized starting end to a predetermined ready position so that the seized end is stationed in readiness for removal to a subsequent filament end tying operation, means for subsequently removing said starting end from said predetermined ready position to the tying device, and abutment means mechanically joined with and extending forwardly of said suction nozzle in a radially inward direction so as to engage the outermost conically wound layer of said coil with a force sufficient to limit the amount of yarn withdrawn from the coil into said suction nozzle, said means to ready the replenishing coil comprising means for positioning said coil so that a component of the weight of said coil produces at least part of said force.

References Cited in the file of this patent

UNITED STATES PATENTS

378,290	Clark et al.	Feb. 21, 1888
957,700	Morgan	May 10, 1910
2,208,930	Kahlisch	July 23, 1940
2,670,150	Perry et al.	Feb. 23, 1954
2,769,599	Furst	Nov. 6, 1956

FOREIGN PATENTS

300,346	Great Britain	Nov. 15, 1928
489,985	Germany	Jan. 22, 1930