

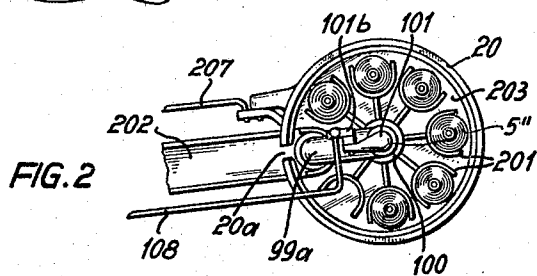
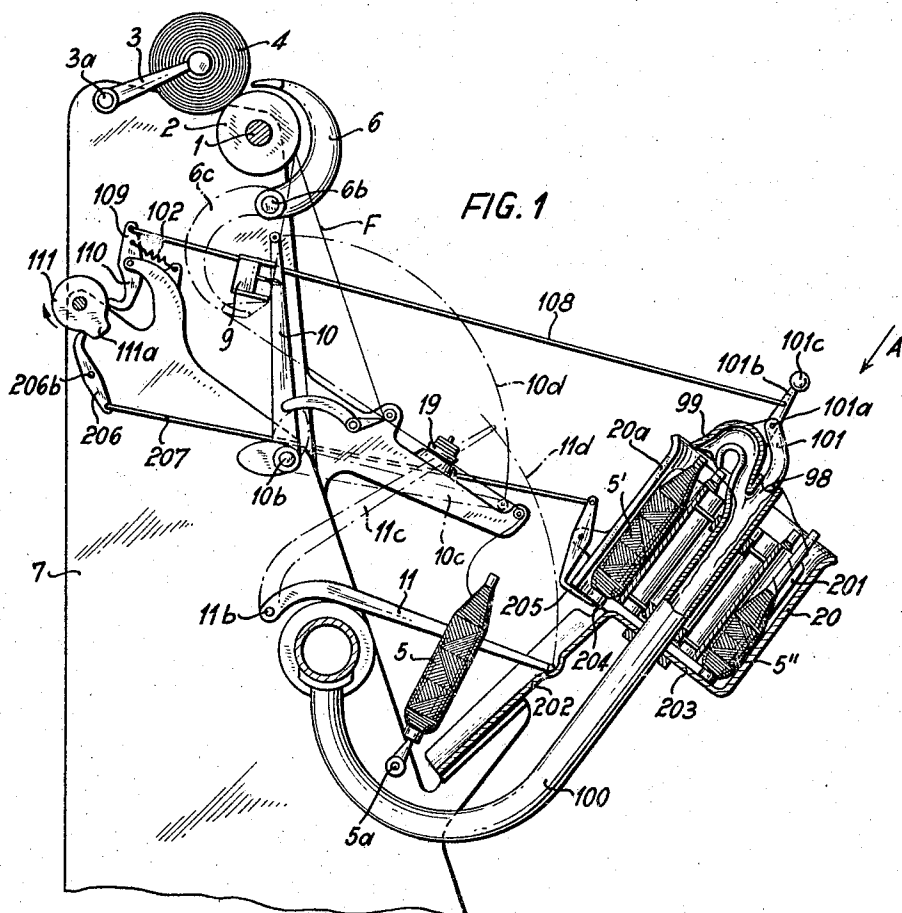
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3,265,316

AUTOMATIC YARN-WINDING MACHINE

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AUTOMATIC YARN-WINDING MACHINE

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My invention relates to an automatic yarn-winding machine, and more particularly to an automatic winding machine of the type that has a supply coil magazine for supplying coils sequentially.

Automatic winding machines, such as cheese and cone winding machines for example that are provided with a supply coil magazine in which the supply coils are inserted by hand or automatically, are known. The yarn ends of the supply coils are sought out mechanically or by suction and are thus readied so that in the course of the processing of this coil they can be entrained and delivered to an operating member of the winding station, such as the knotting device for example.

Since it would require considerable expense for a device to automatically seek and ready a yarn end that might be located almost anywhere on the supply coil, coils of the type which have the yarn end previously readied by placing the same at a specific location on the coil, i.e. in the form of a tip bunch for example, are generally supplied to the supply coil magazine. This readying of the yarn end generally occurs either directly at the spinning frame or on some other mechanical device which performs an operation on the supply coil related to the spinning process.

It often happens that a supply coil only partly unwound is ejected from the winding machine as a result of a break in the yarn between the supply coil and the yarn tensioner. When such partly wound coils are reinserted in a magazine with an automatic yarn-end seeking device, the yarn end must be again readied in a manner similar to that of the original supply coil, i.e. with a tip bunch, for example, in order to accommodate the automatic yarn seeker. Such readying of the yarn end, however, imposes additional work on the servicing personnel because the readying of a yarn end by hand, such as in the form of a tip bunch for example, causes considerable difficulty.

It is accordingly an object of my invention to provide an automatic winding machine which has a device for automatically seeking and readying the yarn end of a supply coil, with a supply coil magazine in which there can be inserted supply coils having yarn ends that are not necessarily readied at a specific location, such as partly unwound cops for example.

To this end and in accordance with my invention, I provide a magazine which, in addition to having a device for automatically seeking and readying the yarn end of the supply coil located in the magazine, also has means for readying the yarn end by hand.

A suction tube, for example, can be employed for automatically seeking and readying the yarn end as is described in Patent No. 2,936,130. Such a device can be provided with an additional opening for readying the yarn end by hand in accordance with my invention. This additional opening is also provided with a lid member which clamps the yarn in closed condition, as is for example described in my Patent No. 3,059,867. Similar to the manner described in the last-named patent, it is possible in the invention of this application to control the lid member both by hand and automatically in accordance with the work cycle of the machine.

Other features which are considered as characteristic for the invention are set forth in the appended claims.

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Although the invention has been illustrated and described as embodied in an automatic winding machine, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims.

The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

FIG. 1 is a schematic, partly sectional view of a yarn-winding machine constructed in accordance with my invention; and

FIG. 2 is a plan view of the supply coil magazine and associated elements taken in the direction of the arrow A of FIG. 1.

Referring now to the drawings and particularly to FIGS. 1 and 2, there is disclosed therein an embodiment of the invention showing a winding machine station. A yarn guide drum 2 is mounted on a shaft 1, the guide drum 2 being engaged by a take-up spool 4 mounted on a spool carrier 3 which is pivotable at 3a. The take-up spool 4 is driven by the yarn guide drum 2. The yarn F is unwound from the supply coil 5, passes across a yarn tensioner 19 and is wound up on the take-up spool 4. Two yarn-seeking arms in the form of suction tubes 6 and 10 convey the yarn ends to the knotting device 9 in the event of a yarn break between the tensioner 19 and the take-up spool 4. An additional yarn-seeking member 11 conveys the yarn from a replacement supply spool 5 within the reach of the yarn-seeking suction tube 10 which then for its part delivers it to the knotting device. Insofar as described above, a winding station of this type is more fully illustrated and described in my aforementioned Patent No. 3,059,867, for example.

There is, furthermore, provided a circular supply coil magazine 20, which is mounted on a suction tube 100. The supply coils are contained in compartments consisting of U-shaped channels or shells 201 which are mounted in circular arrangement in this supply coil magazine as clearly shown in FIG. 2. The shells 201 are rotatably mounted about the suction tube 100, and each time the depleted supply coil 5 is doffed, the shells 201 are rotatably advanced through a sector, or a distance of one shell by well-known and conventional means, such as pawl and ratchet assembly, for example. At a location in the base of the supply coil magazine, an opening 204 is provided, which is normally closed by a lid 205. This lid 205 is opened periodically by the cam 111 through the double lever 206, centrally pivoted at 206b, and the rod 207. A chute 202 is located beneath the opening 204 of the supply coil magazine 20, the supply coil 5' being slidable down the chute 202, after the lid 205 is opened, onto the pivotable supply coil peg or holder 5a which is suitably pivoted from the position shown in FIG. 1 to receive the same thereon. This coil exchanging operation is initiated and carried out in the conventional manner as described in my Patents Nos. 2,733,870 and 2,769,599.

The suction tube 100 has an opening 99 at its free end which is curved back on itself toward the magazine. The suction tube 100 automatically entrains the yarn ends that are readied on the spools 5' and to ready them for the winding station. A suction device particularly suitable for this purpose is disclosed for example in my copending application based on my application Serial No. 353,692, filed March 23, 1964. An additional opening 98 of the suction tube 100 is able to be covered by a closure arm 101. The closure arm 101, pivotable on pin 101a, is rigidly connected to a lever 101b which is

in turn connected to a control rod 108, which, due to the rotation of the cam 111 acting through a double lever 109, 110 centrally pivoted on the machine frame periodically exposes the opening 98 so that a yarn end is sucked into the tube 100 at this location. Shortly after sucking the yarn into the tube 100, the closure arm 101 is returned to its illustrated position in which the second opening 98 is again closed so that the yarn which is sucked into the opening 98 is clamped firmly at the edge thereof.

FIG. 2 is a view of the supply coil magazine 20 taken in the direction of the arrow A of FIG. 1 which shows the suction tube 100 that acts as the rotational shaft for the shells 201. Also shown is the curved suction arm portion 99a which is located above the supply coil 5' that is the next one to be delivered to the peg 5a down the chute 202. The separate shells 201, by the well-known means aforementioned are rotationally advanced through a sector of the circular magazine at each doffing and replacement of the supply coil, during which the supply coils are supported on the bottom wall 203 and the circular side wall of the supply coil magazine 20. As noted hereinabove, an opening 204 is provided in the bottom wall 203 of the supply coil magazine above the chute 202. This opening 204 is normally closed by the lid 205.

After the supply coil 5 is depleted, the empty spool is doffed in a known manner and the supply coil peg 5a is pivoted slightly clockwise, as shown in FIG. 1, in such a way that a supply coil 5' sliding out of the supply coil magazine 20 down the chute 202 can slide up on the peg 5a. When the depleted supply coil 5 is to be replaced, the downward movement of the supply coil 5' on the chute 202 from the supply coil magazine 20 is actuated by the cam 111 which is rotated in the direction of the associated arrow by any suitable drive means, the lobe 111a thereof causing the double lever 206 to pivot counterclockwise, as viewed in FIG. 1, and thereby actuate the connecting rod 207 to pivot the lid lever 205 clockwise and expose the opening 204.

As soon as the supply coil 5' slides onto the peg 5a from the supply coil magazine 20, the peg 5a pivots back again to the location shown in FIG. 1 as described for example in my aforementioned Patent No. 2,733,870. Since the yarn end is still entrained in the suction tube 100, the yarn consequently extends from the suction tube 100 to the tip of the supply coil, sliding through the slot 20a of the supply coil magazine. By means of a yarn-seeking and entraining device, such as described in the last-mentioned patent, the suction tube or arm 11 is pivoted about 11b along the line 11d to the position 11c shown in phantom, the yarn being carried along therewith. Since, in the interim, the suction tube 10 has been pivoted about 10b along the line 10d to a location 10c also shown in phantom, the yarn which is carried by the suction tube 11 in an upward direction as shown in FIG. 1 can then be entrained by the suction tube 10 and conveyed to the knotting device 9. At the same time, the yarn end of the take-up spool 4 is conveyed by the suction tube 6 to the knotting device 9 so that the yarn ends from the take-up spool and the supply coil can be knotted together. At the end of the knotting operation, the yarn extending from the knotting device 9 to the opening 99 of the suction tube 100 is severed and is thereafter sucked into the suction tube 100.

If the supply coil which is to replace the depleted coil 5 is one of those having a yarn end that is firmly clamped in the opening 98 of the suction tube 100, designated in the figures by the reference character 5'', the stopper 101 is opened by the cam 111 which, shortly before the end of the supply coil replacement operation, i.e. shortly before the cam 111 reaches the position shown in FIG. 1, causes the double lever 109, 110 to swing counterclockwise because of the rising contour of the lobe 111a. As a consequence thereof, on the one hand the clamped yarn end is freed so that it can also be sucked away

through the tube 100 after it has been severed following the knotting operation as described in my Patent No. 3,059,867, for example, and on the other hand, each exposure of the suction opening 98 for a period of short duration after each supply coil replacement, enables the yarn with the coil 5'' to travel around the suction tube 100 and to take a suitable position for the supply coil replacement operation. In addition, during the short period during which the suction tube opening 98 is opened after each supply coil replacement operation, those yarn ends which have been placed in the opening 98 by hand are sucked into the suction tube 100. If no special clamping device is provided for placing the yarn ends by hand into this opening 98, such as disclosed in my Patent No. 3,059,867, the opening 98 can also be opened for a short period by the actuation of the knob 101c by the servicing personnel, so as to be able to convey the yarn to the suction tube 100.

I claim:

1. In a yarn winding machine for winding yarn from yarn-supply coils into larger packages having a supply-coil holder and a take-up package holder and a yarn path between the two holders, a knoter disposed along the path for joining the respective yarn ends from the coil and the package, and first yarn-seeking means for passing the respective ends to the knoter, the combination of a supply-coil magazine apparatus comprising a plurality of compartments for receiving supply coils sequentially dischargeable onto the supply-coil holder so as to substitute a new coil for a depleted coil doffed therefrom, automatic yarn-readying means disposed on said magazine apparatus and having second yarn-seeking means actuable upon the coils in said compartments for entraining therefrom a starting length of yarn in a given position to which said first yarn-seeking means has access as each supply coil passes from said magazine apparatus onto said coil holder, and manually actuable yarn-readying means also disposed on said magazine apparatus and operable for entraining from selected coils a starting length of yarn in said given position.

2. The combination according to claim 1, wherein said automatic yarn-readying means and said manually actuable yarn-readying means include a common suction tube having a separate opening for each of said means for sucking a yarn end into said tube.

3. The combination according to claim 2, wherein said manually actuable yarn-readying means also includes a closure member mounted on said magazine and movable into a position in which it closes the suction tube opening of said manually actuable yarn-seeking means and clamps a yarn end therein.

4. The combination according to claim 3 including means for manually moving said closure member in and out of said closing position.

5. The combination according to claim 3 including means for automatically moving said closure member in and out of said closing position as the machine is in operation.

6. The combination according to claim 3, including separate means for selectively moving said closure member respectively manually or automatically in and out of said closing position.

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