DEVICE FOR INCREASING THE SPEED OF COIL REPLACEMENT IN A CREEL ASSEMBLY

FIG. 1

FIG. 2

FIG. 3

FIG. 4
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1. Claims.

My invention relates to a device for increasing the speed of coil replacement in a creel assembly.

It is known that during warping a relatively large group of threads are wound or reeled onto warping beams with speeds of up to 1000 meters per minute from cross-wound coils or cheeses by the so-called over-the-head drawing-off method. If the cross-wound spools have been already completely unwound after one or more warping beams have been wound, the virtually depleted cross-wound coils are replaced. For this purpose, the cross-wound coils are located on so-called creel carriages whereby they can be rolled out of the creel assembly. Prior to doing this, however, the threads between the warping beam and the cross-wound supply coils are severed. After the creel carriages with the depleted coils are removed, other creel carriages provided with fully wound supply coils are rolled into the creel assembly. At this point, the thread end of the individual replacement cross-wound coils must be caught out and gripped so that it can be inserted in the thread tensioning devices of the creel assembly. From these thread tensioners, the threads are then supplied to the comb of the warping machine. To facilitate the insertion of the threads in the comb of the warper, it has been heretofore proposed that the threads inserted in the thread tensioners be collected by rows in groups and secured in a thread holder whereby the threads of several, and preferably all, of the vertical rows of the creel assembly are led with the thread holder to the comb of the warper. Nevertheless, the insertion of the thread ends into the tensioners calls for a very time-consuming operation whereby the replacement of the unused supply coils is further delayed due to the requirement of again having to seize the threads which have been inserted in the thread tensioners and securing them in the thread holder.

It is accordingly an object of my invention to avoid the aforementioned disadvantages of the known devices for replacing depleted supply coils in a creel assembly and more particularly to reduce the time consumption necessary for effecting the replacement of the depleted coils.

With the foregoing and other objects in view, I provide in accordance with my invention a device wherein I dispose at the level of each supply coil of the creel a seizing member located between the vertical rows of tensioning devices and movable therethrough in a direction toward the supply coils for seizing the thread ends which had been suitably placed in readiness or readied at the supply coils for delivering them to the respective tensioners. It is also possible to deliver the threads from the supply coils to the thread tensioners by suitable mechanical or automatic means.

In accordance with another feature of my invention whose objective is to shorten the period of time necessary for replacing depleted supply coils of a creel assembly, I provide a clamping or gripping device to which the seizing member for a vertical row of coils in the creel is rigidly connected. By such means, it is possible to insert the thread ends of all the supply coils, located above one another in the creel, simultaneously into the thread tensioners. If necessary, it is even possible to rigidly connect to one another the seizing members of several vertical creel rows.

In accordance with still another feature of my invention with the objective of even further mechanizing the necessary operation of replacing the depleted coils in the creel, I provide that the clamping device be mounted so that it may travel along the creel. In this case it is possible to provide the traveling clamping device with a thread holder which can take up the thread ends that are inserted in the tensioners. The delivery of the threads from the tensioners to the thread holders can thereby be effected either by one servicing operator accompanying the clamping device or also by suitable mechanical means automatically. In the latter case, there would thereby be provided practically a fully automatic creel in relation to the replacement of depleted supply coils.

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

Although the invention is illustrated and described herein as embodied in device for increasing the speed of supply coil replacement in a creel assembly, 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 specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a front-elevational view of a creel assembly constructed in accordance with my invention;

FIG. 2 is a front-elevational view of the right-hand portion of the creel shown in FIG. 1 showing schematically a later phase of the operation thereof;

FIG. 3 is a top-elevational view of FIG. 1;

FIG. 4 is a top-elevational view of FIG. 2;

FIG. 5 is an elevational side view, much enlarged, of a fragment of the creel viewed in the direction of the arrow A in FIG. 2;

FIG. 6 is a top plan view of FIG. 5;

FIG. 7 is an isolated view of element 15 shown in FIG. 6;

FIG. 8 is a top plan view diagrammatically showing the drive mechanism for the seizing member of FIG. 6; and

FIG. 9 is a front-elevational view of a mechanized or automated creel assembly constructed in accordance with my invention.

Referring now to the drawings and first particularly to FIG. 1 thereof, there is shown a creel carriage 1, which travels on wheels 2 and is provided with journal pins 3 for receiving the cross-wound supply coils 4 which are to be unwound. When the cross-wound coils 4 are stuck onto the journal pins 3, the thread ends thereof are tied together by the individual placing the coils onto the journaling pins, substantially at a location 5 intermediate the uppermost and the lowermost coils of the vertical row of coils in the creel. The thread ends of the cross-wound coils are hereby readied and, in fact, in the illustrated case of FIG. 1, in such a manner that they can be clamped between the bristles of a brush 3e located in front of the journaling pin 3.

There is further schematically shown in FIG. 1 a support post 6 on which the individual thread tensioners 7 are secured. Seizing members, which will be described more fully hereinafter, represented by the dot-dash lines 8, are integrable between the adjacent supporting posts 6. When the seizing members 8 are withdrawn, they transfer the threads to the respective tensioners 7 so that after the threads are collected, the positions indicated by the dot-dash lines 9 are attained by the threads.
In the top-elevational view of FIG. 3, the supply coils 4 on the pins 3 with the brushes 3a, as well as the tensioners 7, can be readily recognized. There is additionally illustrated a seizing member 10 whose original position is shown in phantom, the seizing members being insertionally movable between two vertical rows of tensioners 7 in a path corresponding to the dot-dash line 11. Thus the seizing member seizes with its forward barbed hook 19a the thread end previously readied on the cross-wound coil 4. The thread end, in the solid line position of the seizing member 10, is drawn off the coil 4 and transferred to the respective tensioner 7. The seizing member then returns preferentially in the same way to the dot-dash or phantom original position thereof.

It can be seen from FIG. 2 how the thread ends can be drawn or guided into the vicinity of the tensioner 7 by the seizing member. The threads of a vertical row of coils in a creel are drawn from the tensioning zone in accordance with the dotted lines 12 so that the connecting point or intersection point 5 of all the threads is clamped in the thread holder 13.

In the top-elevational view of FIG. 4 there are shown the thread lengths F1 and F2 of the vertical coil rows of the creel that are farthest away from the warper (not shown) which have already been inserted in the comb 13 so that the seizing member can seize the threads of the next vertical coil rows of the creel corresponding to the dot-dash or phantom line 14.

In the enlarged fragments of FIGS. 5 and 6 there is shown how the threads can be drawn from the cross-wound coil 4 and supplied to the tensioner. Besides the supply coils 4 seated on the pins 3, one can see the supporting post 6 for the thread tensioners 7 which, in this case, have the form of double disc tensioners. These disc tensioners are provided with insertion contours 15 which take up the threads at the end of the movement of the seizing member 10 as indicated by the dot-dash line 11 (FIG. 6). The seizing member is then returned in the same way along the dot-dash line 11. In the interest of affording a better view thereof, the thread tensioner 7 with the insertion contour 15 is shown in isolation in FIG. 7. It is also noted from FIG. 5 that all the seizing members 10 for a vertical coil row of the creel are firmly connected to one another by a rod 16. In this way, all the thread ends of the supply coils 4 of one creel row, located one above the other, can be simultaneously supplied to the respective insertion contour of the appertaining tensioner 7.

The seizing members 10 do not have to be moved implicitly according to the dot-dash line 11 (FIG. 3), but such movement can be achieved with particularly simple means as shown for example in FIG. 8. A frictionless plural-linkage transmission system is illustrated in FIG. 8, which has proven to be particularly suitable for driving the seizing member 10. The holder arm 17 of the seizing member 10 is connected articulatedly with control rods 18 and 19 at the locations 17a and 17b. The control rods 18 and 19 are connected at the joints 20 and 21 respectively with the fixedly mounted pivots 22 and 23 and at the joints 24 and 25 respectively with the fixedly mounted crank rods 26 and 27. If these crank drives 26 and 27 are rotated in the direction of the arrows at the same rotary speed, the dot-dash curve 11 will then automatically be the path taken by the seizing member 10. When the seizing member 10 is at the upper apex of the dot-dash line 11 (FIG. 8), the control rods 18 and 19 are then located at the phantom or dash-dot position thereof at 18' and 19' in FIG. 8.

As seen clearly in FIGS. 5 and 6, the seizing member first places the thread at the insertion contour 15 for the tensioner 7. A thread path along the dot-dash line 15a from the insertion contour 15 to the non-illustrated thread holder (but see FIG. 9) may then result. If the thread holder 13 then moves in a direction toward the beam warper, e.g. in the direction of the arrow in FIG. 5, the pull exerted on the thread then acts to insert the thread along the insertion contour 15 of the tensioner into the tensioner 7 whereby a thread path corresponding to the dot-dash line 7a is produced.

As aforementioned, it can be advantageous for further mechanizing or automating the replacement of coils in a creel assembly, when the seizing member for one or more vertical coil rows of a creel rigidly connected to more than one gripping device is mounted for traveling along the creel, that this traveling gripping device or gripping device be provided with a thread holder for taking up the thread ends inserted into the tensioner. Such a device is shown in FIG. 9 in the same phase of operation as is shown in FIG. 1. The seizing members 10 firmly connected to one another by the rod 16 are already in the gripping position. They are supported by a rod 25 with a carriage 29 capable of traveling along the creel. The carriage 29 is provided both with the thread holder for taking up the thread ends inserted into the tensioners, as well as with the drive for the entire gripping device. This drive can be of the type illustrated in FIG. 8. The joints 17a and 17b for the device of FIG. 8 are then correspondingly mounted on the bar 28. The carriage 29 can be provided additionally with an arresting or braking device 30 which ensures that the carriage will always stop at the desired gripper location in front of a vertical coil row of the creel.

The gripping device 10, 16, 25 first draws off the threads of the coil row of the creel which is farthest from the warper. Then, the carriage 29 travels farther in the direction of the warper for a creel division so that the gripping device, operating stepwise, fishes out the readied thread ends of the full cross-wound coils 4 stuck on the lattice-like frame 1 and inserts them in the zone of the thread tensioner. From there, the thread ends are clamped in the common thread holder 13 along the dot-dash line provided with an arrow 31 and travel together in a direction toward the warper. The insertion of the threads in the common thread holder 13 can be effected either by hand or by a mechanical gripping device.

As variously aforementioned, depending upon desired conditions, it is possible without difficulty to vary different details of the embodiment of the device constructed in accordance with the invention and herebefore described.

Thus, the entire device can be more or less fully mechanized. By means of the seizing members located at the level of each supply coil of the creel lattice and movable between the vertical tensioner rows in a direction toward the supply coils for seizing the thread ends readied at the supply coils and transferring the seizing tensions, it has become possible for the first time to considerably increase the speed with which the coils of the creel are replaced and especially the speed with which the threads are inserted in the tensioners. The invention of this application permits, both by manual servicing or fully automatically, to draw off the threads from the coils, insert them into the tensioners and finally clamp them in the common thread holder, an interval of about 3 to 4 seconds per coil row of creel lattice being required for this entire operation with manual servicing. This period can be even further reduced with skilled and well-familiarized servicing personnel, as well as when the device is made fully automatic.

I claim:

1. In a creel assembly including a multilevel creel for supply coils having readied thread ends, the coils being arranged in substantially vertical rows of tensioning devices also arranged in substantially vertical rows spaced from the creel and adapted to be located intermediate the creel and a warper for performing warper operation on the thread from the supply coils, the improvement comprising a seizing member disposed at each level of the supply coils mounted on the creel and located between the vertical rows of tensioning devices, said seizing member being movable between said vertical rows of tensioning devices in a direction toward the supply coils for seizing
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the readied thread ends thereof and delivering them to the respective tensioning devices.

3. Creel assembly according to claim 1 wherein the seizing devices for a vertical row of supply coils mounted on said creel are firmly connected to one another to form a clamping device.

4. Creel assembly according to claim 2 wherein the clamping device is mounted for traveling along the creel.

6. Creel assembly according to claim 3 wherein the traveling clamping device is provided with a thread holder for taking up the thread ends inserted in the tensioning device.

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