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DRIVE MECHANISM ARRANGED ON AN AUTOMATIC LOOM FOR THE STRIPPER FOR THE END WINDING OF A WEFT-BOBBIN TO BE INSERTED INTO THE SHUTTLE

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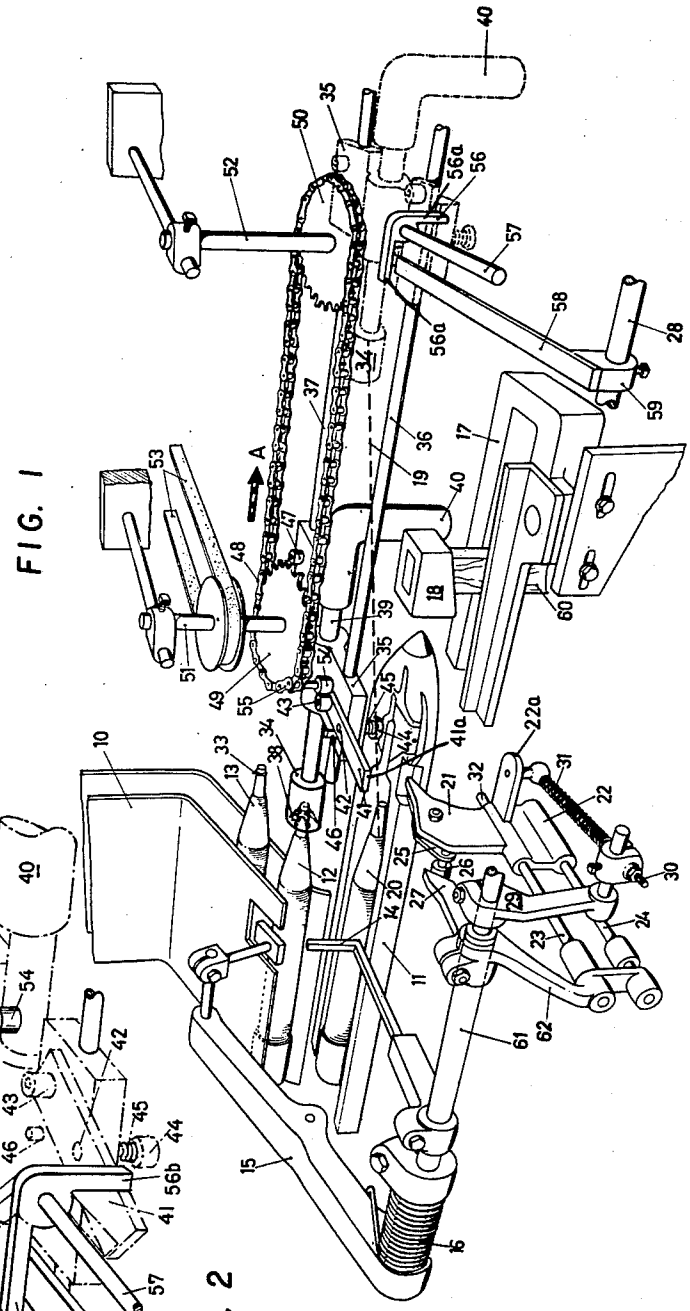

FIG. 1

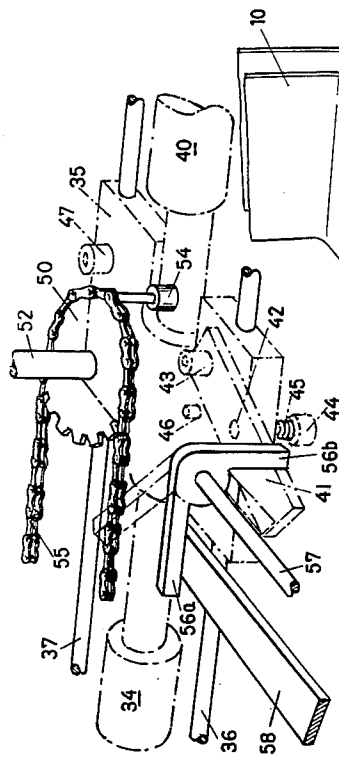

FIG. 2

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DRIVE MECHANISM ARRANGED ON AN AUTOMATIC LOOM FOR THE STRIPPER FOR THE END WINDING OF A WEFT-BOBBIN TO BE INSERTED INTO THE SHUTTLE

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The present invention relates to an improved drive mechanism arranged on an automatic loom for stripping the end winding of a weft-bobbin to be inserted or knocked into the shuttle, wherein the stripper provided with a mouthpiece or nozzle is arranged on a movable carrier and is pushed back and forth past the tip of the bobbin to be inserted.

Strippers of this type known to the art, exhibit drive mechanisms which effectuate a prompt forward and return displacement of the stripper, in that for example the drive of the stripper occurs through the slay or pneumatically. The stripper is thereby pushed forwardly and backwardly in fractions of a second. Such prompt movement requires large forces, has the result of quickly wearing the individual parts of the drive and carries out an unreliable stripping of the end winding.

The drive mechanisms according to the present invention permits of an optionally slow forward and return displacement of the stripper and is essentially characterized in that, an endless member, for example a chain or the like, is provided for the actuation of the stripper, which travels over two sprocket wheels and is provided with a catch. Further, the stripper is displaceably arranged on a slide exhibiting two stops, which stops are located in the path of travel of the catch of the endless member for forward and return displacement of the stripper.

Accordingly a primary object of the present invention is to provide an improved drive mechanism for the stripper for the end winding of a bobbin to be inserted into the shuttle permitting of reliable stripping of the bobbin end winding.

Another important object of the present invention is to provide an improved drive mechanism for the stripper for the end winding of the bobbins to be knocked into the shuttle which permits for an optionally slow forward and return movement of the stripper.

Still another object of the present invention is to provide an improved drive for the stripper for the end winding of a bobbin providing for a relatively improved reduction in wear of the individual parts with resultant enhanced life thereof, while engendering a reliable stripping of the bobbin end-winding.

It is a further object of the present invention to provide an improved drive mechanism for displacing the stripper for the end winding of a bobbin to be inserted into the shuttle which is manifested in its reliable operation and relatively simplified construction.

Yet a further object of the invention is directed at providing an improved drive mechanism for the stripper for the end winding of a bobbin to be inserted into the shuttle comprising a driving member provided with entrainment means cooperable with stop members arranged in the path of travel of said entrainment means on a support carriage or slide for the stripper.

Another object of the present invention is to make the forward and return movement of the slide for the stripper dependent upon operable engagement of an entrainment member with separate stop members cooperatively associated with said slide, and wherein means are further provided to displace at least one of said stop members out of the effective path of travel of the entrainment member whenever it is desired to prevent stripping of the end winding of the bobbin, advantageously in conjunction with the operation cycle of the loom.

These and still further objects of the invention will become more readily apparent by referring to a preferred embodiment of the present invention given by way of illustration and not by way of limitation, in the accompanying drawing wherein: FIGURE 1 diagrammatically depicts the improved drive mechanism for the stripper for the end winding of a weft-bobbin to be inserted into the shuttle; and

FIGURE 2 illustrates the position of the stripper of the drive mechanism of FIGURE 1 when such stripper is not in operation.

Referring now to the drawing it will be recognized that there is diagrammatically illustrated a portion of an automatic loom provided with a device for stripping and holding the outer thread end or end winding of the weft-bobbin to be inserted into the shuttle. On the right side of the loom illustrated in the drawing, there is located the automatic bobbin-change which has the function of replacing the weft-bobbin located in the shuttle with a new one as soon as its supply of yarn is exhausted or approaches exhaustion. The bobbin-change is initiated by a suitable bobbin feeler which tests the spool during each working cycle of the loom through a side opening of the shuttle and determines depletion of the supply of yarn. Bobbin feelers suitable for this purpose are well known to the art. For example, in the commonly assigned Swiss Patent 332,769 which was granted on November 15, 1958 a bobbin feeler suitable for the aforementioned purpose is disclosed. Similarly, another bobbin feeler arrangement is disclosed in United States Patent 3,028,883 invented by L. G. Urquhart, granted April 10, 1962 which serves to test for yarn depletion at the shuttle.

The automatic bobbin-change of the present invention is provided with a bobbin-supply channel 10, in which there are located the reserve bobbins 12, 13 which are to be driven or inserted into the shuttle 11, said bobbins under the influence of gravity glide or slide downwardly against a stop 14. This stop 14 prevents that the lowermost or leading bobbin 12 within the bobbin channel 10 prematurely falls down, which bobbin during a bobbin-change should be inserted in the shuttle 11 via a drive hammer 15 by knocking-out the almost emptied bobbin 20 in a manner familiar to those skilled in the art. The drive hammer 15 is maintained in its upper position shown in the drawing by means of a torsion spring 16. This drive hammer 15 is actuated in a known manner by the slay 17. A picker 18 which is connected to a whip 60 is provided for driving the shuttle 11.

In order to cut the weft thread 19 of the weft-bobbin 20 located in the shuttle 11 and which is to be exchanged, there is provided a so-called outer scissors 21.

The outer scissors 21 is displaceably mounted by means of a slide 22 upon two rigid guide rods 23 and 24 towards the shuttle 11. A roller 26 is provided at the movable knife edge 25 for opening and closing the outer scissors 21, said roller cooperating with a stop 27. A bearing bracket 62 for carrying the stop 27 and the guide rods 23, 24 is mounted upon a non-rotatable rod 61. A lever 29 is secured to a rotatable shaft 28 for displacing the outer scissors 21, which lever via a rod 30 through the agency of links 22*a* is connected with the slide 22 of the outer scissors 21. By means of a helical thrust spring 31 arranged circumjacent the rod 30 it is rendered possible that the slide 22 together with the outer scissors 21 can be somewhat displaced away from the shuttle 11, without the lever 29 having to be correspondingly displaced. In order to prevent that the outer scissors 21 contacts the shuttle 11, there is provided a stop 32 on the slide 22 of the outer scissors 21 which bears against the slay 17 and which is so adjusted that a predetermined spacing is present between the shuttle 11 and the outer scissors 21 during the forwardmost position of the slay 17.

The weft-bobbin 12 located in the bobbin channel 10 and which is to be inserted into the shuttle 11 possesses an end winding 33 which is stripped-off of the weft-bobbin 12 by a known stripper 34. In order to displace the stripper 34 the latter is secured to a carriage or slide 35 which is displaceably guided on two guide rods 36 and 37. These two guide rods 36 and 37 are connected in a suitable manner to the non-illustrated housing of the loom. The stripper 34 exhibits a cap or brim of elastice tongues 38 which in the forwardmost position of the stripper 34 engage behind the end winding 33, and with return movement of the stripper 34 draws such end winding off of the tip of the bobbin or spool 12. The stripper 34 is advantageously connected to a conduit or pipe 39, in turn connected via a hose 40 with a non-illustrated suction-device. By means of this suction-device the end winding seized by the elastic tongues 38 of the stripper 34 is drawn through the pipe 39, the hose 40 and into a non-illustrated collecting vessel.

A pivotal lever 41 which is rockable or pivotable about a pin 42 is arranged on the slide 35, upon which lever 41 there is connected a stop or roller 43. A torsion spring 45 which, on the one side, is connected to the slide 35 and, on the other side, to a guide ring 44 screwed onto the pin 42, strives to pivot the lever 41 such that this lever 41 abuts against a bolt member 46 secured to the slide 35. A second roller or stop 47 is further connected to the slide 35. The roller 43 mounted on the pivotable lever 41, as well as also the roller 47 mounted directly on the slide, serve to displace the slide 35 along the guide rods 36, 37, in that they work together with a driving member, which in the desired form shown is an endless chain 48 arranged above the slide 35. This chain 48 travels over two fixedly mounted sprocket wheels 49 and 50 connected to two shafts 51 and 52 respectively, mounted in the non-illustrated loom frame. The shaft 51 is slowly driven via a band member 53 from the lower shaft of the loom.

Entrainment means in the form of a catch member 54 is connected to a chain member or link 55 of the endless chain 48, said catch member cooperating with the two rollers 43 and 47 of the slide 35. The chain 48 is driven via the band 53 in the direction of the arrow A. When the catch 54 bears against the roller 43, then the slide 35 is displaced along the guide rods 36 and 37 towards the bobbin or spool 12. On the other hand, if the catch 54 bears against the roller 47, then the slide 35 is displaced in the other direction along the guide rods 36 and 37 away from the bobbin 12 and into the position illustrated with phantom lines.

An angle lever 56 is adapted to work together with the pivotal lever 41, said angle lever being rockably or pivotably mounted upon a fixed shaft 57. This angle lever 56 is actuated by a pivotable rod 58 which is connected via a clamp 59 to the rotatable shaft 28 serving to displace the outer scissors 21. If the angle lever 56 is located in the position illustrated in the drawing, then the pivotal lever 41 abuts against the angle lever 56 with its portion disposed between the roller 43 and the free end 41*a* of said pivotal lever when the slide 35 has been displaced into the position illustrated in phantom lines, so that the pivotal lever 41 is rocked against the action of the torsion spring 45. By virtue of this rocking or pivoting movement of the pivotal lever 41 the roller 43 connected thereto arrives out of the effective operating range of the catch 54 secured to the endless chain 48, so that such cannot displace the slide 35 towards the bobbin 12. The endless chain 48 thus rotates empty for such length of time as the pivotal lever 41 remains in this pivoted position effectuated by the angle lever 56. In order to influence a displacement of the slide 35 towards the bobbin or spool 12 it is necessary to pivot the angle lever 56 out of the range of the pivotal lever 41, so that the latter can be pivoted by the action of the torsion spring 45 in such a manner that the roller 43 again arrives in the operating zone or range of the catch 54. Such is undertaken by means of the pivotable rod or lever 58 mounted on the rotatable shaft 28, as will be more fully explained shortly.

The mode of operation of the described apparatus is as follows:

When the mentioned but non-illustrated bobbin feeler determines that a bobbin-change is to take place, then the changing operation is initiated in a known manner. The bobbin-change takes place after the shuttle 11 has arrived from the left side of the loom where it has been probed by the bobbin feeler, at the right side of the loom at which location the bobbin-change device is situated. After the shuttle 11 together with the bobbin or spool 20 to be exchanged has reached the shuttle box at the right side of the loom, the drive hammer 15 is actuated in known manner via the slay 17, in that the latter bears against a pin or plug of the drive hammer 15. The new spool 12 already previously freed from its end winding 33 then is knocked into the shuttle 11, whereby the empty or near empty bobbin or spool 20 is knocked-out.

At the same time the weft thread 19 of the weft-bobbin 20 to be knocked-out of the shuttle 11 is cut by the outer scissors 21, in that the outer scissors 21 actuated by the shaft 28 is pushed forwards. Consequently, the angle lever 56 is upwardly displaced out of the range of the pivotal lever 41 by the shaft 28 via the rod 58 which then bears against the leg 56*a* of said angle lever. Under the action of the torsion spring 45 the pivotal lever 41 is thereby turned towards the bolt 46, so that the roller 43 of the pivotal lever 41 arrives in the path of movement of the catch 54 connected to the chain 48. Now, as soon as the catch 54 of the continuously driven chain 48 pushes or bears against the roller 43, then the slide 35 together with the end-winding stripper 34 located thereon is pushed forwardly towards the bobbin or spool 12 in the bobbin channel 10 which is to be inserted during a bobbin-change. The pliable tongues 38 are pushed in known manner over the end winding 33 and engage behind the same.

After the slide 35 has reached its forwardmost position, the catch 54 slides in its path of travel off the stop or roller 43, abuts against the stop or roller 47 and again displaces the slide 35 back into its starting position illustrated in phantom lines (FIGURES 1 and 2). Upon drawing back or rearward displacement of the slide 35, the end winding 33 is stripped from the tip of the bobbin 12 via the tongues 38 of the stripper 34, and under the action of the suction-air is drawn through the pipe 39, the hose 40 and into the previously mentioned collecting vessel. Due to the drawing back of the slide 35, the pivotal lever 41 again abuts against the leg 56*b* of the angle lever 56 which in the meantime has been released by the rod 58, and is pivoted against the force of the tor-

sion spring 45. The stop or roller 43 thereby arrives out of the operating range or zone of the catch 54 and the stripper 34 can thus not be displaced into its end-winding stripping position for such time until, with a subsequent bobbin-change, the angle lever 56 is pivoted due to actuation of the outer scissors 21 and the pivotal lever 41 is thereby released. FIGURE 2 shows the position of the stripper 34 with pivotal lever 41 in engagement with angle lever 56 and the stripper not in operation.

The stripping of the end winding 33 from the next bobbin 13 thereby occurs subsequent to the bobbin-change, that is to say, upon the ejection of the empty spool 20 and knocking-in or insertion of the new spool 12; and for such stripping of the end winding from the bobbin 13 there is available the entire period of time between two bobbin-changes.

While there is shown and described a present preferred embodiment of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practised within the scope of the following claims.

Having thus described the present invention, what is desired to be secured by United States Letters Patent, is:

1. A drive mechanism for a loom for driving a stripper for the end winding of a weft-bobbin to be inserted into the shuttle provided with a mouthpiece engageable with the tip of said bobbin carrying said end winding, a carrier member supporting said stripper for displacement forwardly and rearwardly over the tip of said bobbin, a driving member for displacing said stripper, said driving member including an entrainment member, stop means operatively connected with said stripper located in the path of movement of said entrainment member for engagement by the latter to displace said stripper forwardly and rearwardly over the tip of said bobbin, a bobbin-change mechanism, and means responsive to operation of a bobbin-change to initiate operation of said stripper immediately after a bobbin-change has taken place.

2. A drive mechanism for a loom for driving a stripper for the end winding of a weft-bobbin to be inserted into the shuttle provided with a mouthpiece engageable with the tip of said bobbin carrying said end winding, a carrier member supporting said stripper for displacement forwardly and rearwardly over the tip of said bobbin, an endless driving member for displacing said stripper, said endless driving member including an entrainment member, stop means operatively communicating with said stripper located in the path of movement of said entrainment member for engagement by the latter to displace said stripper forwardly and rearwardly over the tip of said bobbin, said stop means comprising at least two stop members, one of said stop members being mounted for pivotal movement into and out of said path of movement of said entrainment member, a bobbin-change mechanism, and means responsive to the operation of said bobbin-change mechanism to cause said one stop member to move into the path of movement of said entrainment member.

3. A drive mechanism for a loom according to claim 2; wherein means are provided to pivot said one stop member out of said path of movemnet of said entrainment member to prevent movement of said stripper into engagement with said bobbin.

4. Drive mechanism arranged at an automatic loom for the stripper for the end winding of the weft-bobbin to be inserted into the shuttle, said stripper having a mouthpiece displaceable forwardly and rearwardly over the tip of said weft-bobbin to be inserted, comprising a carrier for supporting said stripper mounted for movement towards and away from said weft-bobbin, an endless driving member for actuating said stripper, said movable carrier comprising a slide provided with a pair of stop members, said driving member being provided with a catch cooperating with said stop members of said slide to displace said stripper forwardly and rearwardly over the tip of said weft-bobbin to be inserted into the shuttle, a bobbin-change mechanism, and means responsive to operation of a bobbin-change to initiate operation of said stripper immediately after a bobbin-change has taken place.

5. Drive mechanism according to claim 4; including a lever pivotably mounted and supporting one of said stop members, an abutment for said pivotably mounted lever, means providing a force for urging said pivotably mounted lever against said abutment, an angle lever movably supported for holding said pivotably mounted lever together with said one supported stop member out of the path of travel of said catch.

6. Drive mechanism arranged at an automatic loom for the stripper for the end winding of the weft-bobbin to be inserted into the shuttle, said stripper having a mouthpiece displaceable forwardly and rearwardly over the tip of said weft-bobbin to be inserted, comprising a carrier for supporting said stripper mounted for movement towards and away from said weft-bobbin, an endless driving member for actuating said stripper, said endless driving member comprising a chain, a pair of sprocket wheels over which said chain travels, said movable carrier comprising a slide provided with a pair of stop members, said stop members being individual roller elements, said chain being provided with a catch cooperating with said roller elements of said slide to displace said stripper forwardly and rearwardly over the tip of said weft bobbin to be inserted into the shuttle, a bobbin-change mechanism, and means responsive to operation of a bobbin-change to initiate operation of said stripper immediately after a bobbin-change has taken place.

7. Drive mechanism arranged at an automatic loom for the stripper for the end winding of the weft-bobbin to be inserted into the shuttle, said stripper having a mouthpiece displaceable forwardly and rearwardly over the tip of said weft-bobbin to be inserted, comprising a carrier for supporting said stripper mounted for movement towards and away from said weft-bobbin, an endless driving member for actuating said stripper, said endless driving member comprising a chain, a pair of sprocket wheels over which said chain travels, said movable carrier comprising a slide provided with a pair of stop members, said stop members being individual roller elements, said chain being provided with a catch cooperating with said roller elements of said slide to displace said stripper forwardly and rearwardly over the tip of said weft-bobbin to be inserted into the shuttle, a lever mounted for pivotable movement and supporting one of said roller elements thereon, an abutment member cooperating with said pivotable lever, a spring for urging said pivotable lever against said abutment member, a bobbin-change mechanism, and means responsive to operation of a bobbin-change to initiate operation of said stripper immediately after a bobbin-change has taken place and an angle lever pivotably supported for holding said pivotable lever together with said one roller element out of the operating range of said catch.

8. In a loom having a stripper for the end winding of a weft-bobbin to be inserted into the shuttle, a slide movably supporting said stripper, a drive member for displacing said slide in a first direction towards said weft-bobbin to engage said stripper with the end winding of said weft-bobbin and in a second direction to remove the end winding from said weft-bobbin, said drive member and said slide being provided with cooperating members intermittently engageable with one another for enabling movement of said stripper in said first and second directions, a bobbin-change mechanism, and means responsive to operation of a bobbin-change to initiate operation of said stripper immediately after a bobbin-change has taken place.

9. In a loom having a stripper for the end winding of a weft-bobbin to be inserted into the shuttle, a slide for movably supporting said stripper, an endless drive mem-

ber for displacing said slide in a first direction towards said weft-bobbin to engage said stripper with the end winding of said weft-bobbin and in a second direction to remove the end winding from said weft-bobbin, said endless drive member and said slide being provided with cooperating members periodically engageable with one another to enable movement of said stripper in said first and second directions, a bobbin-change mechanism, and means rsponsive to operation of a bobbin-change to initiate operation of said stripper immediately after a bobbin-change has taken place.

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