STOP MOTION ASSEMBLY

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The present invention relates to a novel and improved stop motion assembly for terminating yarn winding or unwinding operations when a yarn is traveling under excess or insufficient tension.

When collecting a plurality of yarns in a close side-by-side relationship on large beams or spools for later use in fabric-forming operations, such as the warp yarn in knitting or weaving machines, it is highly desirable to reflect the yarns on the beam or spool under equal and uniform tension. If one or several of the yarns being collected on the beam or spool are traveling under excess tension and these yarns are later used as the warp for a fabric, the final cloth or fabric produced therefrom will be of extremely poor quality because these over-tensioned yarns will cause puckers or drawn areas within the finished fabric. Should a yarn or yarns be traveling under insufficient tension, the final fabric will have loosely fabricated areas which give a fabric of poor quality. In addition, when a woven fabric which has tight or loose ends therein is dyed, dye streaks will be formed whereby the fabric must be scrapped.

A beam usually contains 800-1200 yarns and it is extremely difficult to maintain the yarns under equal and uniform tension as they are being wound or collected on the beam. There is a great need for a satisfactory stop motion assembly which will terminate the beam operation when a yarn or yarns are running under excess or insufficient tension with respect to permissible set tension limits.

There is still a greater need for a stop motion assembly which will indicate to the operator which of the yarns or yarns were running under excess tension after the beam operation has been terminated.

It is one object of our invention to provide a novel and improved stop motion assembly which may be used in beam operation to assure that the yarns are wound onto the beam under equal and uniform tension.

Another object of our invention is to provide a novel and improved double acting stop motion assembly which is responsive to both excess and insufficient tension in a running yarn or yarn wherein means are provided for indicating which yarn or yarns were running under excess tension once the beam operation has been terminated. Another object of our invention is to provide a pair of electrical signalling units which are actuated by double acting drop-wires for initiating the stopping of the beam operation when the yarn tension is out of balance with predetermined permissible tension tolerances wherein only one of the electrical signalling units has a ground connection.

Other objects and advantages of our invention will become more apparent from a study of the following description and drawing wherein:

Figure 1 is a fragmentary front view of our stop motion assembly;
Figure 2 is a side view partially sectioned of our stop motion assembly showing the position of the drop-wire when the yarn threaded therethrough is running under normal tension conditions;
Figure 3 is a fragmentary view partially sectioned of our stop motion assembly showing the position of the drop-wire after the beam operation has been terminated because of insufficient tension within the traveling yarn threaded through the wire; and
Figure 4 is a side view partially sectioned of our stop motion assembly showing the position of a drop-wire after the winding or beam operation has been terminated because of excess tension within the running yarn threaded through the wire.

Briefly, our invention comprises a first signalling unit such as an elongated electrode bar which loosely supports a plurality of double-acting slotted drop-wires and a second signalling unit such as an elongated electrode bar which is mounted to one side of the first unit and which contains an elongated recess. Each drop-wire has a hook-shaped projection extending from one of its sides and is supported in position during the beam operation by a single yarn threaded through the wire. The first unit or bar serves to terminate the winding or beam operation when insufficient tension conditions prevail in a running yarn or yarns while the second unit or bar initiates the stopping of the beam operation when excess tension conditions prevail in the yarn. The first signalling unit or bar becomes actuated when a drop-wire or wires are lowered into contact with the first unit or bar because of insufficient tension or slack within the running yarn threaded through the wire. The second signalling unit or bar becomes actuated when a hook-shaped projection of a drop-wire or wires becomes seated within the recess of the second electrode bar as the wire or wires are raised by an over-tensioned yarn or yarns.

Referring now to the drawing, our stop motion assembly comprises a first signalling unit such as an elongated electrode bar 1 which is mounted at both ends in a support (not shown). A second similar signalling unit or bar 3 is also mounted in suitable end supports (not shown) to one side of the first electrode bar 1 as shown more clearly in Figure 2. The electrode bar 3 is so positioned that it slants or inclines toward the vertically disposed electrode bar 1. Each of the bars 1 and 3 have a lead wire 5 for supplying current to the bars. The first signalling device or electrode bar 1 has a ground wire 7 which serves as a ground connection for both of the bars 1 and 3 as will be explained more fully hereinafter. For purposes which will be hereinafter explained, a sheet or layer of insulation 4 is affixed to the surface of the bar 3 which faces the electrode bar 1.

A plurality of double-acting drop-wires 9, 9, each of which has an elongated slot 10 cut therethrough, are loosely positioned by their slots over the bar 1. Each wire 9 has a hole drilled therethrough at one end in which an eye or ring yarn guide 11 is supported. A yarn 13, which is to be unwound from a yarn filled bobbin or other supply source supported on a creel and fed to a beam or large spool is threaded through the eye guide 13. As mentioned above, a beam carries 800-1200 single yarns or ends whereby it is required that there be a complementary 800-1200 double-acting drop-wires 9, 9 positioned over the electrode bar 1 to accommodate the same number of yarns or ends leading from a supply creel.

As seen in Figure 2, the yarn travels over guides 13, 17, 17A positioned on either side of the electrode bars and drop-wires. The guide bars 17, 17A are adjustable and may be moved toward and away from each other when
setting-up the permissible high and low tension limits for the traveling yarns. In addition, the electrode bars 1 and 3 are also adjustable vertically whereby accurate permissible tension ranges may be set up for the yarn being collected on a beam or spool.

Figure 2 shows the position of one of the drop-wires 9 when a running yarn 13 threaded through the wire is traveling within the permissible set tension limits. The yarn 13 supporting the wire 9 drags or urges the drop-wire 9 forward in the traveling direction of the yarn so that the forward edge 19 of the drop-wire contacts the insulation layer 4 of the electrode bar 3. The insulation layer, of course, prevents the contacting wire 9 from actuating the electrode bar 3.

Should the yarn 13 be traveling under insufficient tension with respect to the permissible tension range originally set up through adjustment of the position of the guide bars 17, 17 and the electrode bars 1 and 3, the yarn will become slack whereby the drop-wire 9 will be lowered (see Figure 3). The tapered upper end of the slot 10 will contact the electrode bar 1 while the forward edge of the slot will be urged into contact with the ground casing b as the tapered edge moves downward over the bar 1. To separate the ground casing b from the bar 1, a layer of insulation c is provided between the bar 1 and the ground casing b. Under such conditions, the electrode bar 1 becomes actuated and transmits a suitable signal to a cut-off or stopping mechanism device (not shown) which terminates the beaming operation. To determine whether or not any of the wires were running under insufficient tension, the operator need only examine the bar 1 to see if any of the wires are seated thereupon. When the beaming operation is terminated because a yarn end or ends are traveling under excess tension with respect to the permissible set tension range, the yarn 13 threaded through a drop-wire 9 becomes taut between the guide bars 17, 17 whereby the drop-wire is raised with respect to its normal operating position (Figure 2) over the electrode bar 1. As seen in Figures 2 and 3, the forward or leading edge 19 of the drop-wire terminates in a hook-shaped projection 25. The electrode bar 3 contains a similar shaped recess 27 in the upper-left-hand portion of the bar which extends the full length of the bar and receives the hook-shaped projection 25 as the drop-wire 9 is raised by the taut yarn 13. The leading edge of the wire 9 rises in contact with the insulation layer plate 4 of the electrode bar 3 until the tip of the hook-shaped projection rises above the top of the plate 4 at which point the forward drag of the traveling yarn 13 urges the projection 25 into the recess 27 of the electrode bar 3 (see Figure 4). At the same time, the back edge of the slot 10 of the wire is brought into contact with the ground casing b of the electrode bar 1. As this action occurs, a contact is set up from the electrode bar 3, through the drop-wire structure 9 and through the ground casing b of the electrode bar 1 whereby a signal is transmitted to the stopping mechanism for the beaming operation. The operator may then examine the recess to determine whether or not any of the drop-wires are supported thereby. If he discovers a wire or wires so supported, he knows that the yarns threaded through these wires were running under excess tension.

In certain instances when the yarn 13 is subjected to extreme sudden tension of prolonged duration, the hook-shaped drop-wire 9 of the electrode bar 3 is "jerked" up above the recess 27 of the bar 3 and remain there. Contact of the hook-shaped projection 25 with the recess 27 is thereby prevented. To actuate the electrode bar 3 in this instance, the bar 3 has a raised portion or projection 29 which extends above and to the rear of the recess 27 of the bar 3. The forward motion or drag of the over-tensioned traveling yarn 13 carries the drop-wire 9 forward whereby the leading edge of the wire 19 makes contact with the raised projection 29 to actuate the bar 3.

After the beaming operation has been terminated, the yarn 13 slackens slightly thus permitting the hook-shaped projection 25 to become seated in the recess 27.

With the above-described stop motion assembly, the operator may easily determine which of the yarn or yarns 13 were traveling under insufficient tension with respect to the originally set-up tension tolerances. Should the drop-wires 9 be resting upon the electrode bar 1 after the operation has been terminated, the operator immediately knows the yarn or yarns threaded through these drop-wires were traveling under insufficient tension. Should the hook-shaped projections of the projections 25 be seated within the recess 27 of the electrode bar 3, the operator will immediately know that the yarns threaded through these supported drop-wires were traveling under excess tension.

It is easily seen that we have provided a stop motion device of the above nature which is of simple structure and of non-complicated operation. As mentioned above, a variety of tension tolerances may be set up within the device by merely adjusting the position of guide bars 17, 17 and the electrode bars 1 and 3. In addition to the above, the operator may easily determine by a glance which yarns or yarns were running under insufficient or excess tension with respect to the existing tension tolerances of the device.

It is to be understood that changes and variations may be made without departing from the spirit and scope of the present invention as defined in the appended claims.

We claim:

1. A stop motion assembly for use in terminating yarn beaming operations when a yarn is running under excess or insufficient tension comprising a first mounted electrical signalling unit which is responsive to an insufficient tension condition in a running yarn to terminate the yarn beaming operation, a second electrical signalling unit responsive to an excess tension condition in the running yarn to terminate the yarn beaming operation, said unit being mounted at a point to one side of the first signalling unit, a yarn carrying actuating unit for the signalling units loosely positioned over the first signalling unit, said actuating unit contacting and actuating the first signalling unit when the yarn is running under insufficient tension, a projection formed on one surface of the actuating unit, and a recess in the second signalling unit in which the projection on the actuating unit becomes seated to actuate the second signalling unit when the actuator is raised to a specified height by excess tension in the yarn.

2. A stop motion assembly for use in terminating yarn beaming operations when a yarn is running under excess or insufficient tension comprising a first mounted electrode bar which responds to insufficient tension in a running yarn to terminate the yarn beaming operation, said second electrode bar being mounted at a point to one side of the first electrode bar, a double acting yarn carrying dropwire having a slot therein by which it is loosely positioned over the first electrode bar for actuating the bars, said drop-wire contacting and actuating the first electrode bar when the yarn is traveling under insufficient tension, a hook-shaped projection formed on one edge of the drop-wire, and a recess in the second electrode bar in which the hook-shaped projection of the drop-wire becomes seated to actuate the second bar when the wire is raised to a specified height by excess tension in the yarn.

3. A stop motion assembly for use in terminating yarn beaming operations when a yarn is running under excess or insufficient tension according to claim 2 wherein the electrode bar is slanted or inclined toward the first electrode bar.

4. A stop motion assembly for use in terminating yarn beaming operations when a yarn is running under excess or insufficient tension according to claim 2 and wherein said electrode bar is slanted or inclined toward the first electrode bar.
5. A stop motion assembly for use in terminating yarn beaming operations when a yarn is running under excess or insufficient tension according to claim 3 wherein the recess of the second electrode bar is formed in the top portion of the bar.

6. A stop motion assembly for use in terminating yarn beaming operations when a yarn is running under excess or insufficient tension comprising a first mounted electrode bar which responds to insufficient tension in a running yarn to terminate the yarn beaming operation, an electrically grounded casing extending partially around the first electrode bar, a second electrode bar responsive to an excess tension condition in a running yarn to terminate the yarn beaming operation, said second electrode bar being mounted at a point to one side of and inclined toward the first electrode bar, a layer of insulation between the second electrode bar facing the first bar, a double acting yarn carrying drop-wire having a slot therein by which it is loosely positioned over the first electrode bar for actuating the electrode bars, said drop-wire contacting and actuating the first electrode bar when the yarn is traveling under insufficient tension, a hook-shaped projection formed on one surface of the drop-wire, and a recess in the second electrode bar in which the hook-shaped projection of the drop-wire becomes seated to actuate the second electrode bar when the wire is raised to a specified height by excess tension in the yarn, said second electrode bar being connected with the grounded casing of the first electrode bar through contact with the drop-wire which is in turn in contact with the grounded casing.

7. A stop motion assembly for use in terminating yarn beaming operations when a yarn is running under excess or insufficient tension according to claim 2 wherein the second electrode comprises a second point of contact for the drop-wire, said second contact point being located above the recess whereby when the yarn passing through the yarn guide of the drop-wire is subjected to sudden and prolonged tensioning which jerks the wire above the recess of the second electrode bar the wire will be carried forward by the yarn drag exerted thereupon to contact the second raised contact point.

8. A stop motion assembly for use in terminating yarn beaming operations when a yarn is running under excess or insufficient tension comprising a first mounted elongated electrode bar which responds to insufficient tension in a running yarn to terminate the beaming operation, a second elongated electrode bar responsive to an excess tension condition in a running yarn to terminate the yarn beaming operation, said second electrode bar being mounted at a point to one side of and inclined toward the first bar, a plurality of double-acting yarn carrying drop-wires each having elongated slots therein by which they are loosely positioned over the first electrode bar for actuating the electrode bars, said drop-wire contacting and actuating the first electrode bar when the yarn is traveling under insufficient tension, a hook-shaped projection formed on a surface of each wire, and an elongated recess in the second electrode bar in which the hook-shaped projections of the drop-wires become seated to actuate the second electrode bar when they are raised to a specified height by excess tension conditions in the running yarns.

References Cited in the file of this patent

UNITED STATES PATENTS

1,857,837 Blackman May 10, 1932

FOREIGN PATENTS

259,947 Germany May 16, 1913

645,803 Germany June 5, 1937