April 2, 1940. W. M. VOGLER 2,196,088

YARN FEEDING CONTROL DEVICE FOR KNITTING MACHINES

Filed April 21, 1938

Fig. 1

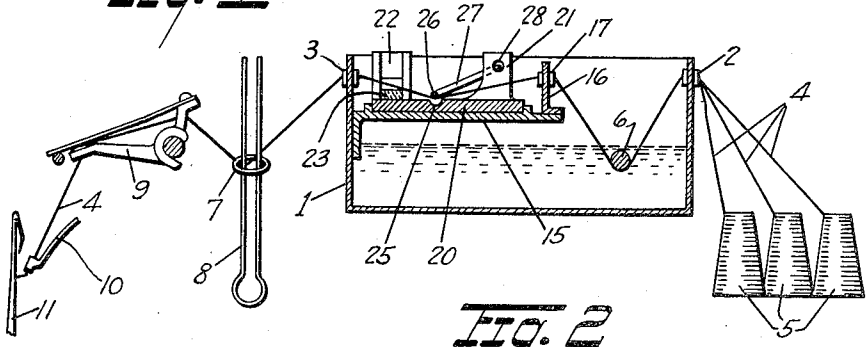


Fig. 2

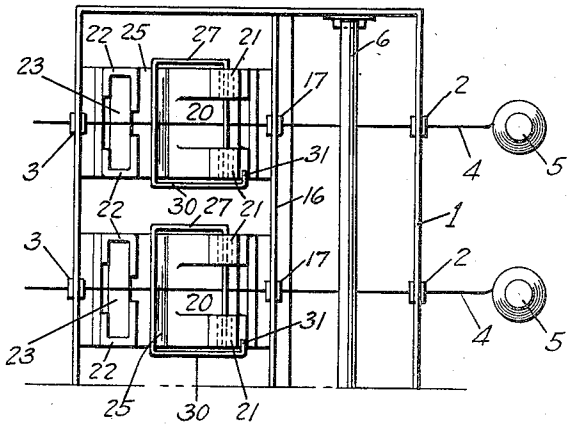


Fig. 6

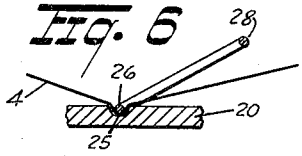


Fig. 7

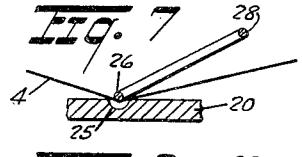


Fig. 8

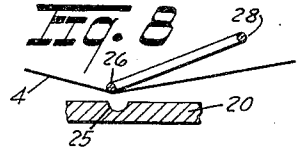


Fig. 4

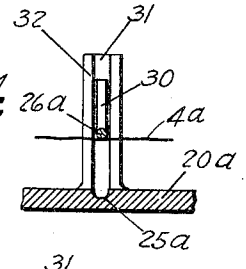


Fig. 3

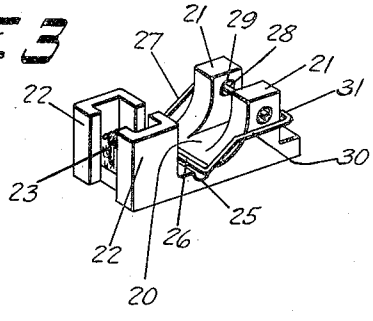
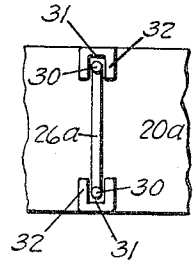


Fig. 5



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YARN FEEDING CONTROL DEVICE FOR KNITTING MACHINES

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Application April 21, 1938, Serial No. 203,285

2 Claims. (Cl. 66—146)

My invention relates to improved means for equalizing and controlling the tensioned feed of the yarns to the carriers of a full fashioned knitting machine, my main object being to facilitate increased production of better fabric with neat selvage edges, by eliminating imperfections and machine stoppages due to improperly tensioned yarns.

In full fashioned knitting machines, as well understood, the yarns are pulled from their supply cones by the reciprocative movements of their carriers feeding a line of knitting needles, the yarns having an indirect line of travel from said cones over a guided course including ordinarily a yarn moistening trough and individual ring device for taking up slack; proper tension of the yarns being ordinarily provided for by a wiping strip of felt or like material over which the yarn is pulled. These felt strips are grooved and cut, particularly by silk yarn, so that their effective tension varies, producing uneven tension. And when a yarn carrier stops pulling at the end of a reciprocation, momentum imparted to the yarn by such pull causes yarn to continue feeding from the cone with little or no restraint from the grooved felt, burdening the ring take up device beyond its capacity and resulting in uncontrolled loops producing defects and particularly rough uneven selvages.

This uneven tensioning of the commonly employed wiping strips of felt has been materially increased by the so-called "ringless knitting" employing a plurality of main yarn carriers pulling one at a time from their respective cones, having inherent yarn differences and winding tensions.

I am aware that such unsatisfactory and variable yarn tensioning has heretofore been fully recognized and its resulting knitting difficulties and imperfections explained in detail not necessary to repeat herein. And I am further aware that in an attempt to overcome them one suggestion employs a pair of rollers as a substitute for the felt wiping strip, one roller freely rotatable and the other having a frictional resistance to rotation, between which rollers the yarn from a bobbin is passed and intended to be tensioned and prevent the pulling of slack between the carrier movements.

I have found in practice that such suggested rollers are unreliable and variable in their action, as dust and lint will accumulatively adhere to them, gradually spreading them apart to a distance where they no longer effectively contact the yarn, causing a gradually decreasing tension, and less and less restraint to uncontrolled slack feed between them.

My present invention relates to new and improved means for controlling the several yarns and equalizing and balancing their proper tension and slack control which has proven effective and constant in its action; and it consists of individual tension control devices for each yarn, the construction and operation of which is more fully disclosed hereinafter in connection with the accompanying drawing, and the novel features of which are pointed out in the appended claims.

Fig. 1 is a diagrammatic cross-sectional view of the yarn feeding portion of a full fashioned knitting machine, indicating essential parts thereof, and showing one embodiment of my invention as preferably mounted in the usual yarn moistening trough.

Fig. 2 is a fragmentary plan view of the moistening trough shown in Fig. 1, and indicating two of my tension and control devices mounted in a side-by-side relation.

Fig. 3 is a separate perspective side view of my tension and control device.

Fig. 4 is a longitudinal sectional view, and Fig. 5 a corresponding plan view of a modified form of my tension and control device.

Figs. 6, 7 and 8 are diagrammatic detail views.

Fig. 1 is intended to indicate certain usual parts of a yarn feeding mechanism for full fashioned knitting machines well known and commonly used, 1 being a cross-sectional view of the moistening trough having guide eyes 2 and 3 in opposite walls for the yarn 4 feeding from supply cone 5 into trough 1, beneath submerging roller 6 in the latter, and out therefrom to slack takeup ring 7, on its guide wire 8, and then through snapper 9 to carrier 10 feeding to needles 11. When several cones 5 are employed, each yarn 4 is separately guided, through trough 1 and its individual ring 7, and snapper 9 to its particular carrier 10, and the reciprocative traverse of the latter pull the yarns from their respective cones in known manner.

Without proper tension and control means for the yarn 4, when a carrier 10 stops sharply at the end of a needle feeding movement, yarn will continue to pull from its cone 5, due to momentum imparted by the carrier pull, so that its slack take-up ring 7 must function not only as intended, to take-up slack between itself and its carrier 10 to keep the yarn tensioned, but also to take up slack between itself and the cone 5, and, without means to adequately prevent such slack pull, the ring 7 sinks to the bottom of its guide wire 8 without taking up all the slack, so that yarn tension is destroyed and uncontrolled loops formed therein, which at the next pull of the carrier are not properly guided, engage undesired needles and their lack of proper tension causes serious defects, yarn breakage, snarls, and the like.

Such faulty tension and yarn feed, as aforesaid, has been heretofore recognized and fully de-

scribed, but no means, to my knowledge, has been provided for properly tensioning and controlling the yarn that will in practice and regular commercial use effectively and constantly act, and I will now describe my improved device which has proven practical under all conditions and has resulted in greatly improved fabric with practically no knitting difficulties due to improper tension.

My tension control device is, for convenience, shown mounted in moistening trough 1, carried therein as on a bracket 15 secured to one trough wall and to an intermediate trough rail 16 having a guide eye 17 shown alined with guide eyes 2 and 3. And my device preferably consists of a block 20 having integral vertical posts at each corner arranged in pairs 21, 21 and 22, 22 and all formed of some hard material as porcelain or the like to resist cutting action of silk yarn; the block 15 being so positioned that the yarn 4 may pass in a free straight line between posts 21, 21 and 22, 22 in its travel between guide eyes 17 and 3. The posts 22, 22, in this instance, are shown as recessed to retain a felt wiper 23 to remove excess moisture from the passing yarn, but this wiper is not relied upon in my device to arrest the feed of the yarn when the pull of a carrier stops, nor to impart any tension to the yarn, said wiper being split or grooved so as to only lightly contact each side of the yarn.

To positively tension and control the yarn and prevent feed from the cone when the pull of the carrier stops, I have shown in Figs. 1, 2 and 3, a transverse clamping groove 25 formed in block 15 and normally lying cross-wise beneath the path of yarn 4; and a tension imparting arm 26, arranged to normally fall into groove 25, and held raised above the latter by riding contact on the passing yarn 4. This arm 26, in this instance, is shown in the form of a bent wire, one connecting link 27 having a bent end forming a pivotal connection 28 engaging bearing apertures 29, 29 in post 21, 21, and the opposite link 30 having a bent end 31 engageable with a post 29 to limit upward swing of arm 26. This construction not only provides for positive retention of the arm 26 in free pivotal position to fall into groove 25, and limit its upward swing, but also provides for its ready removal for change or renewal of the arm 26.

In practical use I have found that one weight of tension arm 26 suffices for a variety of different yarns, but it is a simple matter to change to other weights if found necessary or advantageous; the particular weight of ring 7 employed determining the weight of arm 26. The arm 26 riding on the passing yarn pulled from the cone 5 by movement of carrier 10 imparts a desired tension to the yarn and is in position at all times to fall into groove 25, and does fall into the same as soon as the pull on the yarn ceases, and such falling arm bends the yarn into grooves 25 to clamp it and arrest any further feed from the cone, leaving ring 7 free to act as intended to take up slack between itself and its carrier.

It is not essential that the arm 26 have a pivotal swing, and in Figs. 4 and 5 I have shown a modified form of block, omitting the wiper retaining posts, and indicating an arm 26a of U-shape with its bent legs 30, 30, guided in vertical grooves 31, 31 formed in suitable posts 32, 32, the arm 26a being arranged as before to fall into groove 25a as in the preferred showing.

As better disclosing the action of my tension arm 26 and its engagement in groove 25, I have shown three different positions of said arm 26 in Figs. 6, 7 and 8. In Fig. 6, arm 26 is entirely lowered into groove 25, acting to clamp the yarn 4 therein and prevent pull from cone 5, so that ring 7 is free to take up slack between it and carrier 10 to maintain the yarn tensioned and free from slack and uncontrolled loops. Fig. 7 shows arm 26 raised to impart tension to the yarn drawn beneath it, the yarn however dipping somewhat into groove 25, giving it increased tension over that shown in Fig. 8, where arm 26 is raised so that yarn 4 passes over groove 25 without dipping into the latter. In practice this arm 26 rises and falls as required to maintain a constant and uniform tension, and is not affected by any clinging lint. When a knot occurs, arm 26 freely lifts to pass the same without losing control or changing tension, and extension 31 prevents undue throw of such arm so it will not swing to a non-return position. The action of each arm 26 tensions its particular yarn, irrespective of inequalities and compensates and equalizes the tension for differing hard and soft cones or temporary increased unwinding strain from the cone. Thus tensioned the yarns feed to the several carriers at like tensions at all times, constantly held free from slack, pass knots without strain, prevent jerky feed resulting in yarn breaks and consequently likely pressing off of the knitting, and insure a more even and perfect fabric and neat, clean selvage edges easy to loop. I have found that the required tension, due to its being equalized and constantly controlled by my device, may be reduced from that heretofore normally required, greatly reducing strain on the yarn, and friction and resulting wear and cutting action of silk yarn on the carriers, needles, sinkers, and other parts.

My improved control device may be otherwise located between the ring 7 and cone 5, and its arm 26 is always in position to provide the required and desired tension and to arrest the yarn feed from the cone at once when pull of the carrier 10 stops, irrespective of the length of travel of the latter or rests between travels.

My device may of course be modified or changed within the scope of my invention as defined in the following claims.

What I claim is:

1. In a knitting machine, a yarn-control tensioning device comprising a guide block for the yarn, a groove in said block spaced beneath and free from contact with the normal path of the feeding yarn, and a freely fallable tension arm supported above said groove by riding contact with the feeding yarn and adapted to normally fall and bend the slackened yarn into said groove to control yarn feeding.

2. In a knitting machine, a yarn-control tensioning device comprising a guide block having a pair of vertical posts at each end spaced apart to form a yarn-passing path, and a cross-wise clamping groove in said block intermediate said pairs of end posts and under said yarn path, a yarn-wiper having a yarn passing slot carried by one pair of posts, and a freely swingable tension arm carried by the other pair of posts and arranged to normally fall and bend the yarn into said groove so as to control the yarn feed, said arm being lifted from said groove by the tensioned yarn.

WILLY MAX VOGLER.