W. P. DRUMHELLER.

YARN-CONTROL FOR KNITTING MACHINES.

APPLICATION FILED APR. 10, 1920.

1,420,530. Patented June 20, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

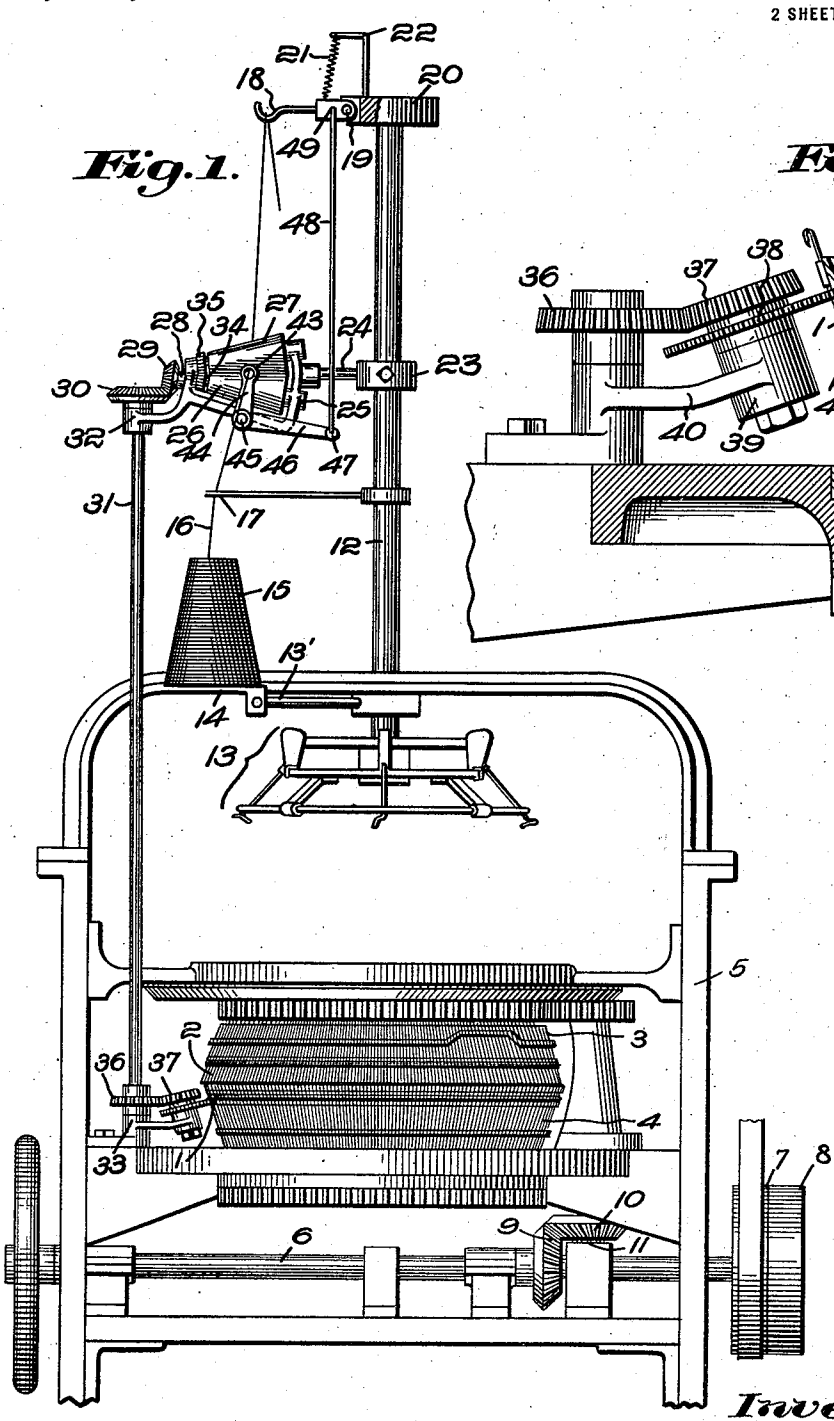


Fig. 2

Inventor:
William P. Drumheller
by Emery, Booth, Janney & Varney
Attys.

W. P. DRUMHELLER.

YARN CONTROL FOR KNITTING MACHINES.

APPLICATION FILED APR. 10, 1920.

1,420,530. Patented June 20, 1922.

2 SHEETS—SHEET 2.

Fig. 3.

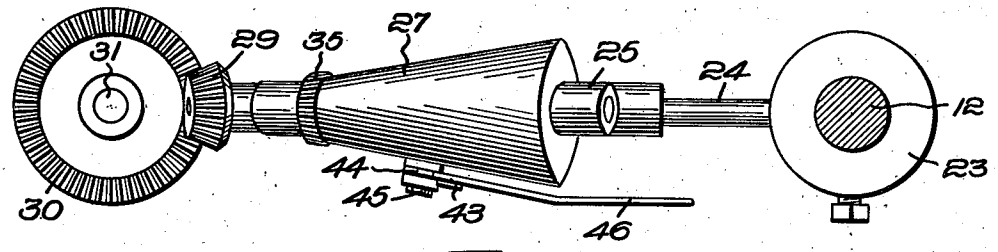


Fig. 4.

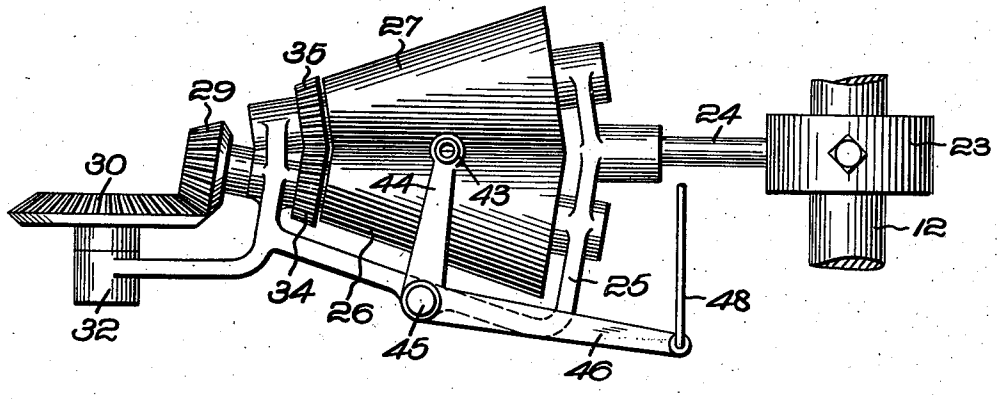
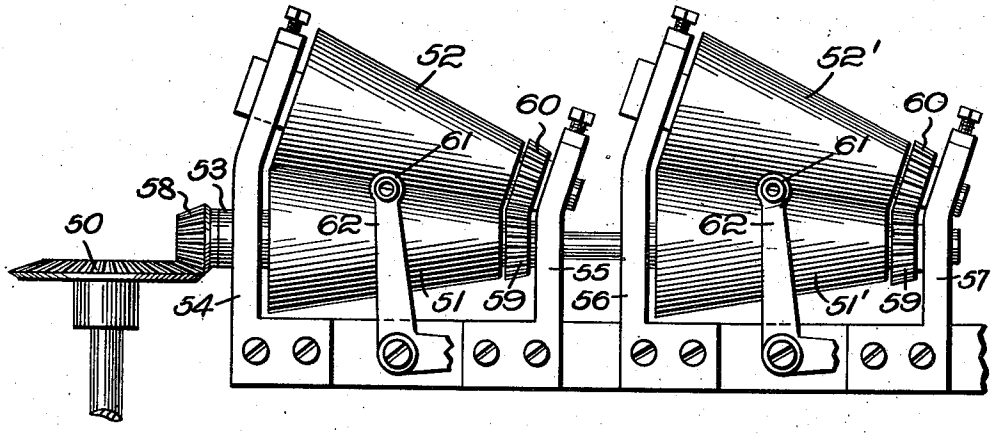


Fig. 5.



Inventor:
William P. Drumheller.
by Emery, Booth, Janney & Varney,
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM P. DRUMHELLER, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO WILLIAM CARTER COMPANY, OF NEEDHAM HEIGHTS, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

YARN CONTROL FOR KNITTING MACHINES.

1,420,530. Specification of Letters Patent. Patented June 20, 1922.

Application filed April 10, 1920. Serial No. 372,980.

To all whom it may concern:

Be it known that I, WILLIAM P. DRUMHELLER, a citizen of the United States, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented an Improvement in Yarn Controls for Knitting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to yarn control for knitting machines, and more particularly to means for effecting a positive controlled feed of the yarn or yarns to the needles or to the needles and immediately co-acting instrumentalities. In order that the principle of the invention may be readily understood, I have in the accompanying drawings disclosed two embodiments of my invention, and by means of which my method may be practised.

In said drawings,—

Fig. 1 is a side elevation of a knitting machine having one type of my invention applied thereto;

Fig. 2 is a detail in side elevation and vertical section showing a part of the construction represented in Fig. 1;

Fig. 3 is a plan view showing a portion of the mechanism of my invention;

Fig. 4 is a side elevation of the construction shown in Fig. 3; and

Fig. 5 is a side elevation of a slightly modified form of my invention.

My invention may be applied to any desired type of knitting machine, as, for example, either straight or rotary, and of the latter type it may be employed with a rotated needle cylinder or a rotated cam cylinder. I have chosen to represent it as applied in Figs. 1 and 2 to a circular type of knitting machine employing two rotary conical needle cylinders. I desire it to be understood that my invention is not limited in its application to the disclosed or any other particular type of machine.

Referring more particularly to the drawings, and first to that form of my invention shown in Figs. 1 to 4 inclusive, the two rotary conical needle cylinders are indicated at 1, 2, and the cam carriers are indicated at 3, 4. These parts may be of any suitable construction and may, for example, be of the general type of mechanism disclosed in the patent to Barratt, No. 1,003,085, dated September 12, 1911.

The said parts are mounted within a suitable frame 5 wherein in suitable bearings is mounted the main drive shaft 6 having fast and loose pulleys 7 and 8 and having a bevelled gear 9 meshing with and driving a similar gear 10 upon an upright shaft indicated at 11 and carrying gears not herein necessary to disclose, that mesh with suitable gears upon the two needle cylinders 1 and 2, whereby the latter are driven in customary manner. Suitably supported upon and extending upwardly from the framing 5 is an upright 12, and preferably upon the lower end thereof I position a suitable thread stop mechanism 13 not herein claimed, and which therefore for the purpose of the present invention need not be further described.

Preferably though not necessarily the knitting machine is one having a plurality of yarn feeds, only one of which is herein represented. The number of yarn feeds may be and within the scope of my invention will be varied in accordance with the particular type or types of knitting machine to which my invention is applied.

In Fig. 1, I have represented as laterally extending from the upright 12 an arm 13 carrying a bracket or support 14 for a suitable yarn package 15.

An important object of my invention is the positive control of the yarn or yarns fed to the knitting instrumentalities, and accordingly my invention comprehends means for procuring such positive control of the knitting yarn or yarns. Obviously such positive control may be effected by many different types of means or devices. In the drawings I have represented a single form or type only of such means or devices.

The yarn 16 as it is drawn from the yarn package 15 desirably passes through certain guides, one of which I have indicated at 17 in Fig. 1. Desirably also the yarn passes over a suitable arm or member 18 pivoted as indicated at 19 upon a suitable head 20 at the upper end of the upright 12. The said arm 18 is represented as normally maintained in the position indicated in Fig. 1 by a coil spring 21 connected to said arm and also to a fixed arm or bracket 22 extending from the

head 20. From the arm 18 the yarn 16 passes to the needles and if desired through one or more guides intermediate the arm 18 and the needles.

The knitting instrumentalities may be of any suitable type and the needles employed may be latch needles, spring beard needles or any other desired type of knitting needle. The yarn or yarns may be directly fed or supplied to the needles, or sinkers, burr wheels or like instrumentalities may be employed to sink the yarn between the needles in a manner well understood and not necessary to describe.

I provide means whereby the yarn 16 is positively fed to the knitting instrumentalities. Desirably I provide means whereby the rate of speed of the positive feed may be varied, and this is effected automatically and the automatic variation is desirably controlled by the tension of the yarn itself. I have chosen in the drawing to represent one form of means for effecting an automatic variation in such positive feed of the yarn.

Herein for carrying out the principle of my invention, I have represented as secured to the upright 12 a collar 23 having laterally extending therefrom an arm 24 carrying a yoke or support 25 wherein are mounted for positive rotation a pair of members herein indicated as conical rolls 26, 27, the surfaces whereof are in contact or substantially in contact, but between which meeting surfaces the yarn 16 passes, as clearly indicated in Fig. 1.

I provide means for positively driving both of the rolls 26, 27, and herein I have represented the shaft 28 of the roll 26 as having a bevelled gear 29 meshing with and driven by a bevelled gear 30 fast upon the upper end of an upright shaft 31, here shown as supported in suitable bearings 32, 33, the bearing 32 being carried by the yoke or support 25. I have represented the conical roll 26 as having at its smaller end a gear 34 meshing with a suitable gear 35 upon the conical roll 27 whereby in this case the roll 27 is positively driven at the same speed as the roll 26.

Upon the shaft 31 at or near its lower end is fast a gear 36 meshing with and driven by a suitable gear 37 fast upon a short shaft in a suitable bearing 39 carried by a bracket or arm 40 extending from the support for the bearing 33.

Fast upon the said short shaft is a gear 38 which as most clearly indicated in Fig. 2 meshes with and is driven by the needle cylinder 1 as by meshing engagement with the walls of the needle tricks or grooves 42 (Fig. 2.)

By the mechanism disclosed the control rolls 26, 27 are driven at a fixed, predetermined rate from the needle cylinder 1, and accordingly the yarn 16 passing between and in contact with the meeting surfaces of said conical roll is fed at the said fixed predetermined rate, to the needles of the knitting machine. It will be understood that depending upon various factors, (such as the size or gage of the needles, the movements imparted thereto and the instrumentalities, if any, immediately co-acting with the needles, such as the sinkers, burr wheels or other parts) the yarn should be supplied at such a fixed predetermined rate as to effect the formation of desirably uniform loops. Heretofore so far as I am aware, it has been customary to supply the yarn more or less freely to the needles, so that the same in their movement may draw the desired or proper quantity of yarn for the formation of the loops, or if the needles were stationary, the co-acting movable parts effect the supply of yarn, or it has been customary to permit the sinkers, burr wheels or like parts to sink or supply the yarn between the needles, and themselves to draw upon the yarn supply.

It is the purpose of my invention to effect a positive feeding of the yarn to the knitting needles or to the sinkers or instrumentalities immediately cooperating with the needles, so that it is unnecessary to rely upon the needles or co-acting instrumentalities to draw the proper supply of yarn and which in practice varies from time to time and under different conditions.

The positive driving of the rolls 26, 27 provides a positive feed of yarn to the needles or to the sinkers or other co-acting instrumentalities.

At or in close proximity to the line of peripheral contact of the conical rolls 26, 27, I provide a suitable yarn guide 43, herein represented as carried by a lever arm 44 pivoted at 45 upon the yoke or support 25. From said pivot 45 extends a second lever arm 46 to the end of which is pivotally connected at 47 an upright link 48, the upper end whereof is connected at 49 to the pivoted yarn arm 18, as clearly indicated in Fig. 1.

Obviously the rate of speed of the yarn 16 between the conical rolls 26, 27 depends upon and varies with the position of the yarn guide 43 with respect to the smaller ends of the conical rolls 26, 27. If the yarn guide 43 be positioned at the smaller ends of said conical rolls, the yarn will be positively fed at a certain minimum rate, and as the yarn guide 43 is moved toward the larger ends of said rolls 26, 27, the rate of speed of the yarn will be increased to a maximum at said larger ends.

Preferably I effect an automatic change in the position of the yarn guide 43 and in the present disclosure of means for practicing my invention I have represented a construction wherein an undue tension upon the yarn through any cause will cause a slight downward movement of the yarn arm 18. This

through the described connections will move the yarn guide 43 toward or to the larger end of the conical rolls 26, 27, thus positively effecting a more rapid feed of the yarn with the result that the proper tension upon the yarn will be restored, and thereupon the yarn guide 43 moves toward the smaller end of the conical rolls 26, 27. Thus a uniform tension is substantially maintained, any local irregularities being at once rectified.

It is clearly to be understood that the broad purpose of my invention is to effect a positive feeding of the yarn to the needles or knitting instrumentalities and under perfect conditions such positive feed may or should remain constant and may be changed only when there is a change in the needles or co-acting knitting instrumentalities or in their movements with respect to each other.

In Fig. 5, I have represented a slightly modified form of my invention. In said figure, I have not illustrated the entire means for driving the members which effect the positive feeding of the yarn, but have therein indicated a bevelled gear 50 corresponding to the bevelled gear 30 in Fig. 1. This form of my invention is intended to provide for the positive feed of a plurality of yarns, and to that end I have represented a plurality of pairs of conical feed rolls 51, 52, 51′, 52′, it being obvious that any desired number of pairs of rolls may be employed, such number depending upon the number of yarn feeds. Desirably and as herein shown I provide a single shaft 53 whereon both the rolls 51, 51′ are fast, said shaft being supported in bearings in suitable brackets 54, 55, 56, 57. Upon the shaft 53 and meshing with the bevelled gear 50 is a bevelled pinion 58. Each of the conical rolls 51, 51′ is provided with a gear 59 meshing with a suitable gear 60 upon each of the conical rolls 52, 52′ whereby said rolls 52, 52′ are positively driven. Preferably I provide yarn guides 61, 61 carried by pivoted arms 62, 62 and which desirably correspond to the yarn arm 44 and desirably are moved in a similar manner depending upon the tension of the yarn.

It will be understood from the foregoing description that I have provided a positive yarn feed or control and that my invention comprehends means for effecting such positive yarn feed or control as herein disclosed.

Having thus described one illustrative embodiment of means for practising my invention and for carrying out my method, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims—

1. Means for yarn control of knitting machines comprising a pair of conical rolls, a yarn guide in proximity thereto, a rotatable needle cylinder, and operative connections between said cylinder and said rolls, whereby the latter are positively driven at a predetermined speed, a movable yarn guide, and connections between said yarn guides, whereby a movement of the last mentioned yarn guide effects a movement of the yarn guide first mentioned, and thereby effects a change in the rate of positive feed of the yarn between said rolls.

2. Means for yarn control of knitting machines comprising a pair of conical rolls, a yarn guide in proximity thereto and mounted for movement along the meeting line of said rolls, a rotatable needle cylinder, operative connections between said cylinder and said rolls, whereby the latter are constantly positively driven at a predetermined speed, a second yarn guide movable responsively to changes in the yarn tension, and operative connections between said yarn guides, whereby said first mentioned yarn guide is moved along the meeting line of said rolls responsively to changes in the yarn tension.

3. Mechanism for yarn control of knitting machines comprising a pair of conical rolls having their peripheries substantially in contact, a yarn guide 43 in proximity to the meeting line of said rolls and mounted for movement therealong, a rotatable needle cylinder, a gear meshing therewith, operative connections including a shaft and gear between the gear meshing with the needle cylinder and said conical rolls, whereby the latter are at all times positively driven at a predetermined speed, a yarn guide 18 movable responsively to changes in the yarn tension, and operative connections between said yarn guide 43 and the yarn guide 18, whereby the former is moved along the meeting line of the said rolls responsively to changes in the yarn tension.

4. Means for yarn control of knitting machines comprising a pair of conical rolls having their peripheries substantially in contact and their smaller ends in proximity, a yarn guide in proximity to the meeting line of said rolls and mounted for movement therealong, a rotatable needle cylinder, operative driving connections between said needle cylinder and one of said conical rolls, positive drive connections between said rolls, whereby both the latter are always positively driven at a predetermined speed, a second yarn guide movable responsively to changes in the yarn tension, and means operatively connecting said first and second yarn guides whereby the former is moved along the meeting line of said rolls responsively to changes in the yarn tension thereby to vary the continuously positive rate of feed of the yarn.

5. Means for yarn control of knitting ma-

chines comprising a pair of conical rolls having their peripheries substantially in contact, a yarn guide in proximity to the meeting line of said rolls and mounted for movement therealong, a rotatable needle cylinder, a gear meshing therewith, operative connections including a shaft and gear between said gear meshing with the needle cylinder and said conical rolls whereby the latter are always positively driven at a predetermined speed, a second yarn guide supporting the yarn and spring retained in normal position, said second guide being movable responsively to changes in the yarn tension, and operative connections between said first and second yarn guides whereby the former is moved along the meeting line of the said rolls responsively to changes in the yarn tension thereby automatically to vary the continuously positive rate of feed of the yarn.

6. Means for yarn control of knitting machines comprising a pair of conical rolls, a pivoted yarn guide in proximity to said rolls and movable along the meeting line thereof, a rotatable needle cylinder, operative connections between said cylinder and said rolls, whereby the latter are constantly driven at a predetermined speed, a spring-controlled pivoted yarn guide resiliently to support the yarn and movable responsively to changes in the yarn tension, and a member operatively connecting said yarn guides.

7. Means for yarn control of knitting machines comprising a pair of conical rolls mounted in fixed relation and having their peripheries substantially in contact whereby to engage always with the same pressure the yarn passing between them, a pivoted yarn guide 43 in proximity to said rolls and movable along the meeting line thereof, a rotatable needle cylinder, operative connections between said cylinder and said rolls whereby the latter are constantly driven at a predetermined speed, a yarn guide 18 movable responsively to changes in the yarn tension, and a member 48 operatively connecting the yarn guides 18 and 43.

In testimony whereof, I have signed my name to this specification.

WILLIAM P. DRUMHELLER.