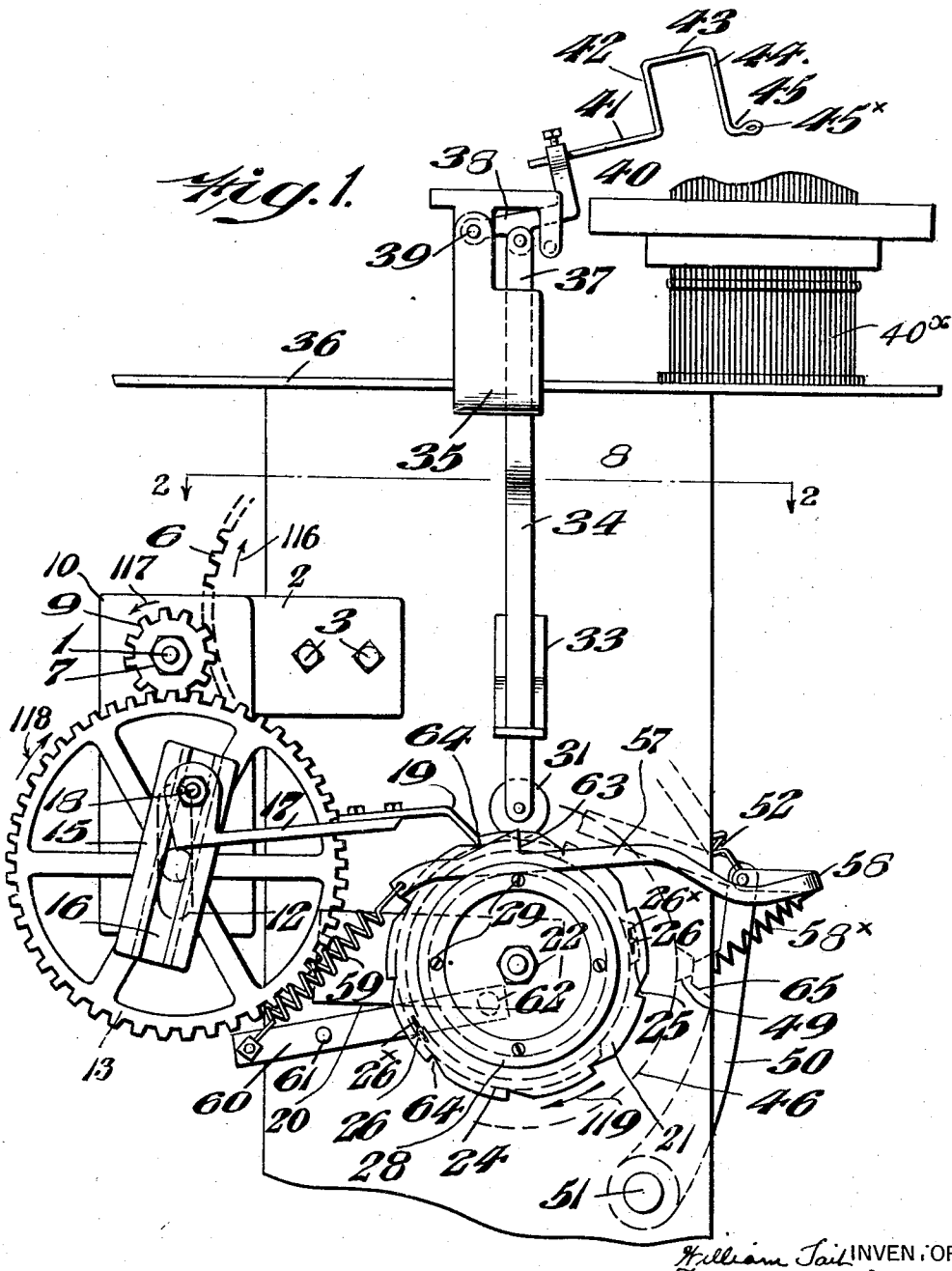
Jan. 13, 1931. W. TAIT ET AL 1,789,058

ATTACHMENT FOR SPRING BEARD NEEDLE KNITTING MACHINES

Filed May 5, 1927 3 Sheets-Sheet 1

Fig. 1.



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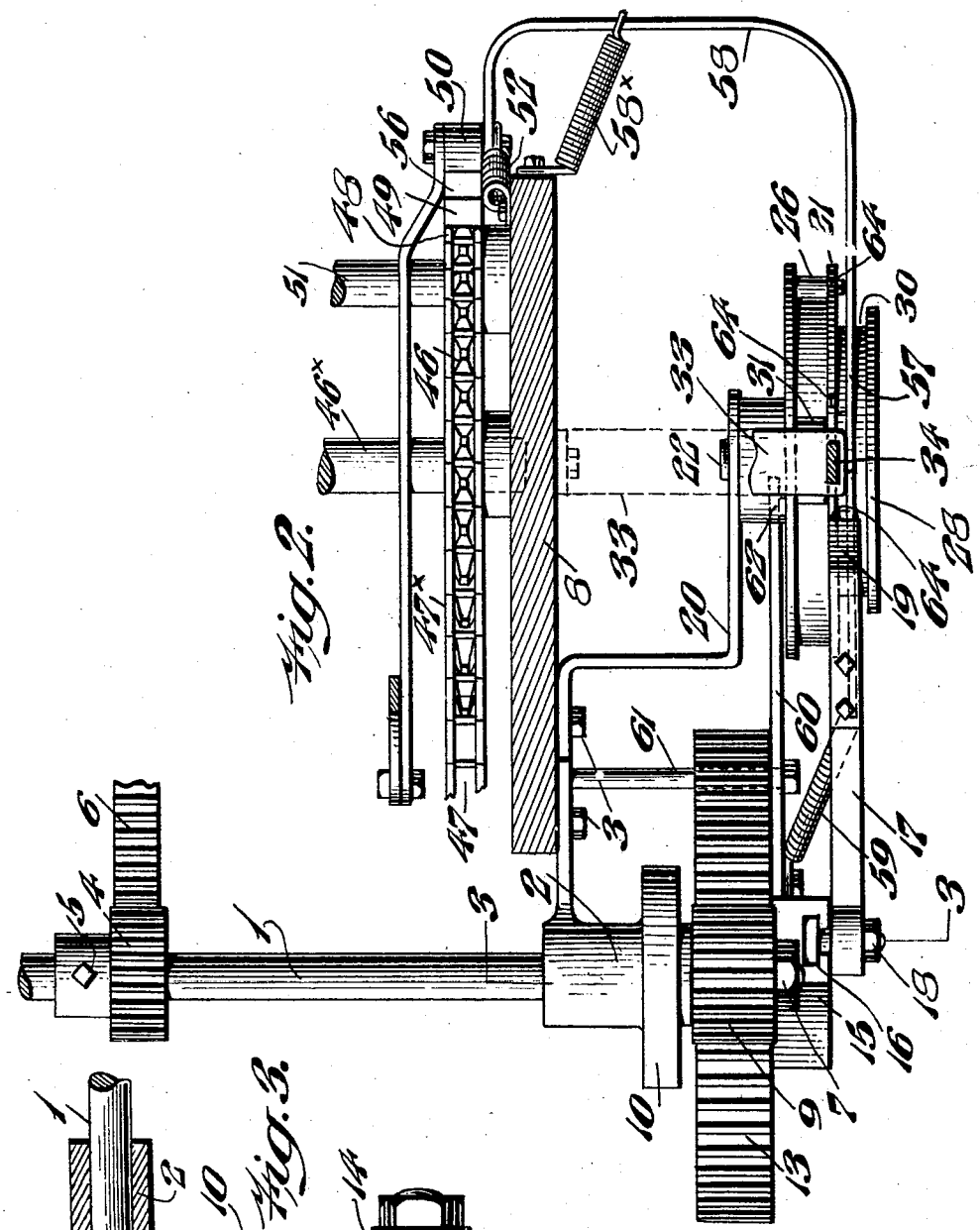


Fig. 2.

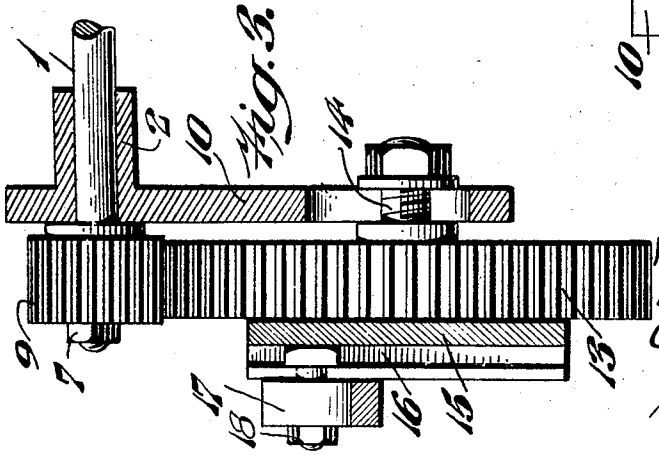


Fig. 3.

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ATTACHMENT FOR SPRING BEARD NEEDLE KNITTING MACHINES

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Fig. 5.

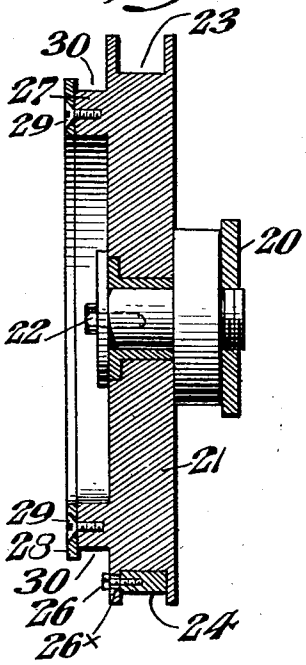
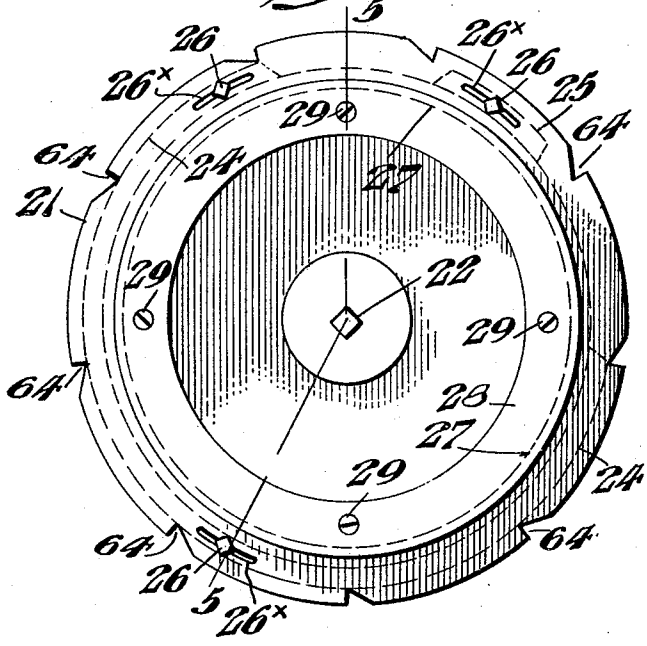


Fig. 4.



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UNITED STATES PATENT OFFICE

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ATTACHMENT FOR SPRING-BEARD-NEEDLE KNITTING MACHINES

Application filed May 5, 1927. Serial No. 188,897.

Our invention relates to a new and useful attachment for a circular spring beard needle knitting machine of the general type represented by the disclosure of Patent No. 1,266,044, whereby an auxiliary yarn feed may be added to the yarns conventionally knitted by such machine to form a stocking in timed relation with the knitting of said conventional yarns to incorporate said auxiliary yarn into the knitting of certain portions of said stocking as the latter is being knitted by said machine.

To the above ends, our invention consists in providing an auxiliary yarn guide or feed disposed in proximity to the needle cylinder of a circular knitting machine, an auxiliary yarn carried thereby, and means for actuating said yarn feed from and into operative relation with respect to said needle cylinder, comprising a wheel adapted to be intermittently rotated, a mechanism actuated by the main driving shaft of said knitting machine, cams on said wheel, and means intermediate said yarn feed and said cams to raise and lower said yarn feed from and into its operative position with respect to said needle cylinder.

Our invention further consists in providing means for regulating the rotation of said cam wheel to predetermine the raising and lowering of said yarn feed in timed relation with the operation of the pattern chain of the knitting machine, to permit the knitting of the auxiliary yarn carried by said auxiliary yarn feed into the desired predetermined portions of the stocking being knit by said knitting machine.

Our invention further consists of means for preventing the accidental rotation of said cam wheel.

Our invention further consists of various other novel features of construction and advantage all as hereinafter described and claimed.

For the purpose of illustrating our invention we have shown in the accompanying drawings a form thereof which is at present preferred by us, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which our invention consists can be variously arranged and that our invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

In the accompanying drawings:—

Figure 1, represents a diagrammatic view in side elevation, of a spring beard needle circular knitting machine equipped with our novel attachment.

Figure 2, represents a section on line 2—2 of Fig. 1.

Figure 3, represents a section on line 3—3 of Fig. 2.

Figure 4, represents a side elevation of the cam wheel controlling the operation of our auxiliary yarn feed shown detached.

Figure 5, represents a section on line 5—5 of Figure 4.

Referring to the drawings in which like reference characters indicate like parts, 1 designates an auxiliary driving shaft journalled in the bearing bracket 2 which is secured by the bolt 3 to the side wall 8 forming part of the housing of a conventional knitting machine. The shaft 1 carries a pinion 4 which is retained by the collar 5 and which meshes with the gear 6 fast on the main driving shaft (not shown) of the knitting machine. The shaft 1 projects beyond the side wall 8 and carries fast the pinion 9 retained by the nut 7 and meshing with the gear 13 which is fast on the stub shaft 14 which is journalled in the lower portion of the pendant plate 10 (in Figs. 1 and 3). The plate 10 is preferably integral with the bearing 2 in which the shaft 1 is only loosely journalled as will be understood from Figure 3. To the front or outer surface of the gear 13 is suitably secured a supporting plate or bar 15 having the longitudinal slot 16 in which is adjustably mounted the bolt 18 which carries the arm or pawl 17 which terminates in the pointed front end 19, the arm 17 being adapted to be reciprocated with each rotation of the driving gear 13 due to the eccentric position of the bolt 18 with respect to the gear 13 as will be understood from Figs. 1 and 3. To the side

wall 8 of the housing of the machine is secured the deflected bracket 20 in which is journalled the stub shaft 22 which carries the cam wheel 21 which has the peripheral groove 23, best seen in Figs. 2 and 5. In the groove 23 are positioned the cams 24 and 25 which are of different lengths and which are adjustably secured in position by the bolts 26, in the slots 26× in the periphery of the wheel 21.

The wheel 21 is further provided with the outer, annular flange 27, which in conjunction with the ring 28, secured thereto by means of the screws 29, forms a groove 30 in which is guided the link 57 hereinafter referred to. In the groove 23 of the wheel 21 rides the roller 31, which is carried at the lower extremity of the vertical bar 34, which is guided in a lateral extension of the bracket 33 secured to the side wall 8 in any suitable manner. The upper portion of the bar 34 passes through the upper guide bracket 35, secured to the top 36 of the machine housing, as will be understood from Figure 1. The upper end 37 of the rod 32 carries the lever 38, the inner end of which is pivoted at 39 to the supporting bracket 35. To the outer end of the lever 38 is adjustably secured the auxiliary yarn feed 40, comprising the lower horizontal portion 41, the vertical portion 42, the upper horizontal portion 43, and the pendant vertical portion 44, which terminates in the horizontal member 45, having the eye 45× therein for receiving an auxiliary yarn not shown. The auxiliary yarn feed 40 is disposed in proximity to and is adapted to coact with the needle cylinder 40× of the knitting machine. 46 designates the sprocket wheel of a knitting machine of this type mounted on the shaft 46× and actuated from the main driving shaft (not shown) in the usual manner to drive the conventional sprocket pattern chain 47, composed of plain links 47× and the suitably spaced pattern links 48 having the outwardly projecting lugs or cams 49. The lever 50, suitably pivoted at 51 and provided with the lug 65 is constantly pressed inwardly against the sprocket chain 47 on the sprocket wheel 46 by means of the spring 52. As the pattern links 48 pass the lever 50, the lugs 49 of said pattern links and the lug 65 of said lever coact to displace the lever 50 at intervals predetermined by the spacing of the pattern links 48 forming part of the sprocket chain 47, function and operation of which are conventional and form no part of the present invention. To the upper end of the lever 50 is secured the bent portion 58 of the horizontally extending link 57, which is guided in the groove 30, best seen in Figure 5. To the rear and front ends of the link 57 are secured the springs 59 and 58× which serve to maintain said link seated in the groove 30 (see Fig. 1). 60 designates a lever rigidly secured to the wall 8 at 61 and carrying at its front end the brake shoe 62, which is adapted constantly to bear against the inner surface of wheel 21, to prevent accidental movement thereof. The upper edge of the link 57 is provided with the cam 63 of a sufficient height normally to prevent the terminal 19 of the pawl 17 from engaging the notches 64 in the periphery of the cam wheel 21, except at certain intervals as hereinafter described.

The operation is as follows:—

The gear 6 driven in the direction of the arrow 116 by the main driving shaft (not shown) revolves the shaft 1 loosely journalled in the bearing bracket 2 to revolve the pinion 9 in the direction of the arrow 117 which in turn drives the gear 13 in the direction of the arrow 118, said gear 13 being loose on the stub shaft 14 which is journalled in the stationary pendant plate 10. With each revolution of the gear 13 the arm 17 eccentrically carried by said gear is reciprocated with the deflected pointed end 19 thereof idling over the cam 63 of the link 57 which normally registers with the juxtaposed notch 64 of the cam wheel 21 to prevent the engagement of the pointed end 19 of the arm 17 from engaging said notch 64 and revolving the cam wheel 21. The link 57 is retained in the groove 30 with the cam 63 thereof registering with the notch 64 of the cam wheel 21 by means of the springs 58× and 59 best seen in Figure 1. The front end 58 of the link 57 is connected to the front end of the conventional lever 50 which is pivoted at 51 (positioned on the inner side of the side wall 8 of the machine, see Figure 2). The lever 50 is provided with the inwardly projecting lug 65 which coacts with the outwardly projecting lugs 49 on the spaced conventional pattern links 48 forming part of the conventional pattern chain 47 which engages the conventional sprocket wheel 46. As the lug 65 of the lever 50 rides over the lug 49 of a conventional pattern link 48, the lever 50 is pushed outwardly or forwardly. Simultaneously with the forward displacement of the lever 50, the link 57 is pulled forward against the tension of the springs 58× and 59 to move the cam 63 out of registration with the juxtaposed notch 64 of the cam wheel 21 thus permitting the pointed end 19 of the lever 17 reciprocated by the revolution of the gear 13 to engage the juxtaposed notch 64 of the cam wheel 21 to revolve the latter in the direction of the arrow 119 a distance equal to the stroke of the lever 17 which is equal to the space between the notches 64 as will be understood from Fig. 1. When the lug 65 of the lever 50 falls off the lug 49 of the juxtaposed pattern link 48, the link 57 is pulled back by the springs 58× and 59 to

bring the cam 63 thereof into registration with the juxtaposed notch 64 of the cam wheel 21 to prevent the further engagement of the front end 19 of the arm 17 with said notch 64 thereby to prevent the revolution of the cam wheel 21 until the parts are again in the position shown in Fig. 1. When the cam wheel 21 has been sufficiently revolved, the roller 31 at the bottom of the bar 34 will ride on the cam 24 (see Fig. 1) thus raising the auxiliary yarn feed 40 from operative relation with respect to the needle cylinder 40× of the knitting machine thereby discontinuing the knitting of the auxiliary yarn into the portion of the stocking being knit while the roller 31 continues to ride on the cam 24 while the wheel 21 is being intermittently revolved as explained. This position of the parts is maintained until the wheel 21 shall have been revolved through an arc equal to the length of the cam 24 by the repeated engagement of the pointed end 19 of the lever 17 with the spaced notches 64 of the cam wheel 21 when the link 57 is in its forward position due to the riding of the lug 65 of the lever 50 over the lugs 49 of the successive pattern links 48, whereupon the roller 31 falls off the cam 24 into the groove 23 in the periphery of the cam wheel 21, thereby lowering the auxiliary yarn feed 40 into operative relation with respect to the needle cylinder 40× of the knitting machine to permit the knitting of the auxiliary yarn carried by said auxiliary yarn feed into the portion of the stocking being knitted while the roller 31 is in the groove 23 intermediate the cams 24 and 25. The roller 31 now remains in the groove 23 until the cam wheel 21 shall have been further revolved in the manner heretofore described, whereupon the roller 31 rides over the short cam 25 in the groove 23 and again raises the bar 34 and the auxiliary yarn feed 40 to discontinue the knitting of the auxiliary yarn carried by said yarn feed into the stocking.

From the foregoing it will be seen that the cam wheel 21 can only be revolved when the link 57 is pulled forward due to the riding of the lug 65 of the lever 50 over one of the lugs 49 of the pattern links 48 and that by properly spacing the pattern links 48 as well as the notches 64 in the periphery of the cam wheel 21 the rotation of said cam wheel may be regulated and controlled to correspond with the main knitting operation to raise and lower the auxiliary yarn feed 40 in proper timed relation to knit the auxiliary yarn carried by the auxiliary yarn feed 40 into predetermined portions of the stocking being knit by said machine. In order to prevent the accidental rotation of the cam wheel 21, we provide the arm 60 fulcrumed at 61 and carrying the brake shoe 62 which frictionally engages the inner surface of the cam wheel 21 to maintain the latter normally stationary.

Having thus described our invention what we claim as new and desire to secure by Letters Patent, is:—

1. In a spring beard needle knitting machine, a yarn feed adapted to carry a yarn auxiliary to the conventional main yarn and means for actuating said yarn feed into and out of the operative position with respect to the needle cylinder of said knitting machine to knit said auxiliary yarn into predetermined portions of the stocking being knitted by said machine, comprising a grooved ratchet wheel, cams of different lengths positioned in the groove of said wheel, actuating means intermediate said cams and said yarn feed for operating the latter, and means for intermittently actuating said ratchet wheel.

2. In a spring beard needle knitting machine, a yarn feed adapted to carry a yarn auxiliary to the conventional main yarn, and means for actuating said yarn feed into and out of the operative position with respect to the needle cylinder of said knitting machine to knit said auxiliary yarn into predetermined portions of the stocking being knitted by said machine, comprising a grooved ratchet wheel, cams of different lengths positioned in the groove of said wheel, means operatively connecting said cams and said yarn feed for controlling the latter, means for intermittently actuating said ratchet wheel, and means for intermittently retaining said ratchet wheel stationary.

3. In a spring beard needle knitting machine, a yarn feed adapted to carry a yarn auxiliary to the conventional main yarn, and means for actuating said yarn feed into and out of operative relation with respect to the needle cylinder of said machine in timed relation with the knitting of the stocking being knit by said machine, comprising a peripherally grooved ratchet wheel, spaced timing cams of different lengths positioned in the groove of said wheel, means for intermittently rotating said ratchet wheel, and means operatively interposed between said ratchet wheel and said yarn feed adapted to raise and lower said yarn feed to permit the knitting of the auxiliary yarn carried by said yarn feed into predetermined portions of the stocking being knit by said machine and to suspend the knitting of said yarn feed during the knitting of other predetermined portions of said stocking.

4. In a spring beard needle knitting machine, a yarn feed adapted to carry a yarn auxiliary to the conventional main yarn, and means for intermittently actuating said yarn feed into and out of operative relation with respect to the needle cylinder of said knitting machine, comprising a ratchet wheel

having a peripheral groove therein, means for intermittently revolving said ratchet wheel, spaced timing cams of different lengths positioned in said groove, a roller guided in said groove adapted to ride on said cams successively as said ratchet wheel is revolved, and means intermediate said roller and said auxiliary yarn feed to raise the latter into inoperative position with respect to the needle cylinder of said machine, to suspend the knitting of the auxiliary yarn carried by said yarn feed during the knitting of predetermined portions of the stocking being knit by said machine, while said roller is on one or the other of said cams.

5. In a spring beard needle knitting machine, a yarn auxiliary to the conventional main yarn feed adapted to carry a yarn, and means for intermittently actuating said yarn feed into and out of operative relation with respect to the needle cylinder of said knitting machine, to knit or to suspend the knitting of said auxiliary yarn into predetermined portions of the stocking being knit by said machine, comprising a ratchet wheel having an inner peripheral groove and an outer peripheral groove, timing cams of different lengths positioned in said inner groove, a roller guided in said groove and adapted to ride on said cams when said ratchet wheel is revolved, a pawl adapted intermittently to engage and revolve said ratchet wheel, a link guided in said outer groove having an upper cam adapted normally to prevent the engagement of said pawl with said ratchet wheel, means adapted to displace said link in timed relation with the knitting operation of the stocking to permit the engagement of said pawl with said ratchet wheel to revolve the latter, and means intermediate said roller and said yarn feed adapted to raise the latter out of operative relation with respect to the needle cylinder of said machine while said roller is riding over one of said cams.

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