

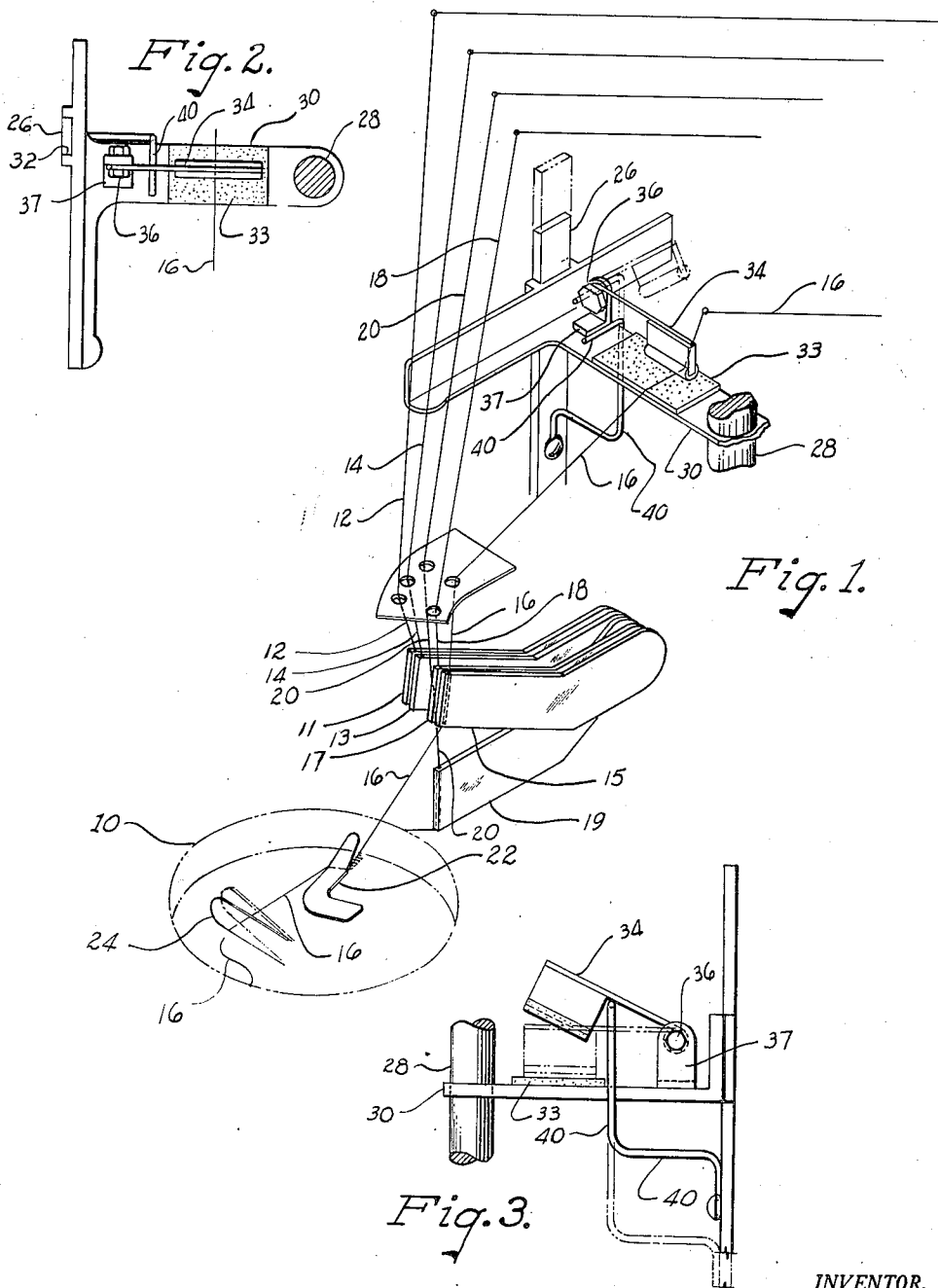
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ATTACHMENT FOR CIRCULAR KNITTING MACHINES

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## ATTACHMENT FOR CIRCULAR KNITTING MACHINES

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1 Claim. (Cl. 66—146)

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In the knitting of a seamless stocking on circular knitting machines, of the type shown in Lawson Patent 1,424,025 of July 25, 1922, or in Hemphill Patent 933,443 of Sept. 7, 1909, or in Scott Patent 1,152,850 of Sept. 7, 1915, one relatively large denier yarn is used for forming the selvage at the upper end of the welt; another relatively large denier yarn is used for forming the welt and shadow welt; a relatively small denier yarn is used for forming the leg and the foot; and still another relatively large denier yarn is used to form the heel and the toe. After the toe is formed, a marginal portion is knit of a coarse and cheap yarn such as cotton. As one portion of the stocking is completed, the guide or finger which feeds the particular yarn used in such portion is automatically raised from the vicinity of the needle cylinder and the finger which feeds the yarn for forming the next portion of the stocking is lowered to feed the particular yarn to be used to the needle cylinder. As each finger is raised, the yarn fed thereby will, due to the rotation of the needle cylinder, pass first under a clamp and next under a cutter, both of which are located within the needle cylinder, whereby such thread is severed.

Because the relatively large denier yarns are sufficiently strong, they are fed to the knitting machine under constant and sufficient tension and, therefore, when the fingers feeding these yarns are raised, the large denier yarns pass under the clamp and under the cutter without difficulty, and the number of rejects due to failure on this score are negligible. However, because the relatively small denier yarn is relatively weak, it is fed under very little tension, if any, and, therefore, when, at the end of the leg portion, the finger feeding this yarn is raised at the time that the needle cylinder changes from rotary to reciprocal motion to form the heel, the small denier yarn from which the leg was formed frequently billows and develops a slack which is caught up by the reciprocating needle cylinder and results in a defective stocking which is wholly discarded as waste. This can take place also at the end of the foot portion and the beginning of the knitting of the toe portion, and, in my experience, the loss in waste resulting from this factor has been considerable.

It is, therefore, the main object of the invention to produce an improved knitting machine by means of which billowing is prevented and prompt severance of the yarn immediately upon the termination of the leg, and again immediately upon termination of the foot of the stock-

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ing is assured, thus eliminating or greatly reducing rejects due to the failure of untensioned or lightly tensioned yarn to pass under the clamp and cutter.

A further object of the invention is to accomplish the main object above set forth by an inexpensive, durable and automatically-operating attachment which can be applied to a conventional circular machine, without in any way altering the structure of any part of the machine.

These and other objects are attained by my invention as set forth in the following specification and as illustrated in the accompanying drawings in which:

Fig. 1 is a diagrammatic, composite view illustrating the application of the invention to a circular knitting machine of the type referred to as viewed from the position of the operator of such machine.

Fig. 2 is a fragmentary top plan view showing details of construction.

Fig. 3 is a fragmentary rear elevational view also showing details of construction.

According to my invention, I provide simple, inexpensive, automatically operable and easily applied means for allowing the small denier yarn to be knit into the leg and foot of the stocking under little or no tension, but which will apply to the small denier yarn a small but sufficient amount of tension immediately upon its becoming necessary for the small denier to pass under the clamp and cutter at the commencement of the heel, and again at the commencement of the toe of the stocking to prevent the formation of slack in said yarn, and thus prevent entangling of the small denier yarn in the needle cylinder during the knitting of the heel or toe portion of the stocking.

As illustrated in a highly diagrammatic manner, a circular knitting machine includes a needle cylinder 10, a finger 11 for feeding a yarn 12 which is used in knitting the selvage, a finger 13 for feeding a yarn 14 which is used in knitting the welt, a finger 15 for feeding a yarn 16 which is used in knitting the leg and foot, a finger 17 for feeding a yarn 18 which is used in knitting the heel and toe, and a finger 19 for feeding a yarn 20 which is used in knitting a marginal portion beyond the toe of the stocking. The yarn 20 is usually cheap cotton or the like and the marginal portion knit of this yarn is removed when the toes are looped.

Each of the fingers feeding the yarns 12, 14 and 18 is lowered and raised by well-known conventional means, not shown, to bring the yarn

carried thereby into or out of reach of the needle cylinder. Because these yarns are all relatively thick and strong, as for example, of the order of sixty deniers, they are fed under sufficient tension. Therefore, each of these yarns will, when its corresponding finger is raised, pass, with satisfactory regularity, beneath a binder or clamp 22 and beneath a cutter 24 to be severed. Since this invention is not concerned with these yarns or their respective fingers, no further description of them is necessary.

The yarn 16, which is fed by finger 15, is used in knitting the leg and foot and is, therefore, quite fine, as for example, of the order of twenty deniers. Because it is relatively fragile, it is fed under little, if any, tension. Therefore, when the leg or the foot is completed, and the finger 15 is raised to take this yarn out of the needle cylinder, the yarn 16 tends to billow and fails, with disturbing frequency, to pass beneath the clamp 22 and cutter 24. Instead, it tends to form a slack which gets tangled in the needle cylinder and ruins the stocking being knit.

A conventional machine of the type referred to includes a thrust bar 26, which is similar to thrust bar 460i in the Scott patent above mentioned, and which reciprocates vertically in a guide recess 32 formed in a bracket 30 carried by fixed post 28. The arrangement is such that, as finger 15 moves down to feed yarn 16 to the needles, the thrust bar 26 moves upwardly, and as finger 15 moves upwardly to take yarn 16 out of the needles cylinder, thrust bar 26 moves downwardly.

In carrying out my invention, I place a bed 33, made of a piece of felt or other friction material, on the bracket 30, below the path of movement of the yarn 16, and I position a faller 34 made of felt or other friction material in vertical alignment with the bed 33. The faller 34 is conveniently pivoted, at 36, to a bracket 37 carried by the thrust bar bracket 30. In order to raise the faller 34 out of contact with the yarn 16 while this yarn is being used to form the leg and the foot of the stocking, I provide an extension or arm 40 which is carried by the thrust bar 26 and which, when the bar 26 is raised, engages and raises the faller 34. Conversely, when the thrust bar 26 moves down upon completion of the leg or of the foot of the stocking, the arm 40 moves down with it and allows the faller 34 to drop, by gravity, onto the thread 16 moving over the bed 33, thus contacting and applying tension on the yarn 16. The tension thus applied causes the yarn to pass beneath the clamp 22 and the cutter 24 to be severed. By thus tensioning the yarn

16 as soon as it ceases to be consumed by the needle cylinder, the formation of slack near the needle cylinder is prevented or greatly reduced.

In actual practice, and as a result of long experience, I have found that without the use of my invention, there was considerable loss due to the causes above set forth, and that by my invention there is, for all practical purposes, no loss on this account.

It will be noted that my invention resides in placing the bed 33 on the already existing bracket 30, in pivotally mounting the faller 34 on the same bracket or on some other already existing part, and in using the conventional vertical movement of the conventional, already existing thrust bar 26 to raise the faller and keep it raised as long as the yarn 16 is being knit, and to allow the faller to drop and tension the yarn when the yarn 16 is no longer to be knit, whereby my invention may be applied to any existing machine at nominal cost.

What is claimed is:

The combination with a circular knitting machine of the type which includes a needle cylinder, a yarn guide for feeding a yarn to said cylinder, a fixed upright post, a guide carried by said post, and a thrust bar reciprocable vertically in said guide, of means for applying tension to the yarn when said yarn is not being knit and for relieving tension on the yarn when the yarn is to be knit, said means including a platform disposed below the path of movement of the yarn from said finger to said needle cylinder, a faller, means mounting said faller for rotation about an axis above said platform with said faller disposed across said path of movement of the yarn, and an actuating arm carried by said thrust bar and adapted, upon upward movement of said thrust bar, to engage and raise said faller to a point above said path of movement of the yarn, said faller being movable, by gravity, upon downward movement of said thrust bar, into engagement with said platform to clamp the yarn against said platform.

CHESTER P. BERG.

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