

Nov. 18, 1924.

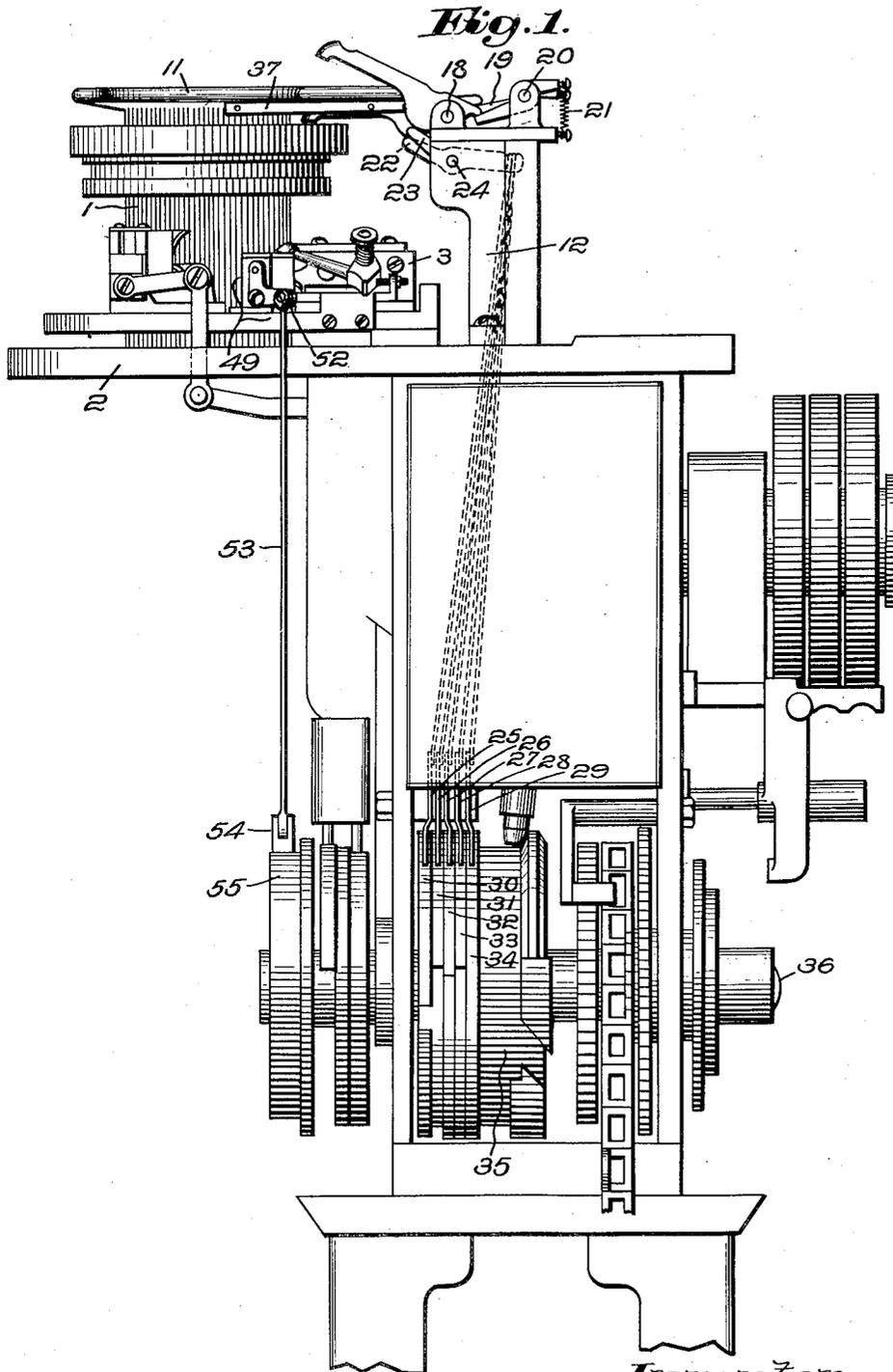
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F. E. JONES

FEEDING MEANS FOR KNITTING MACHINES

Filed Aug. 1, 1922

4 Sheets-Sheet 1



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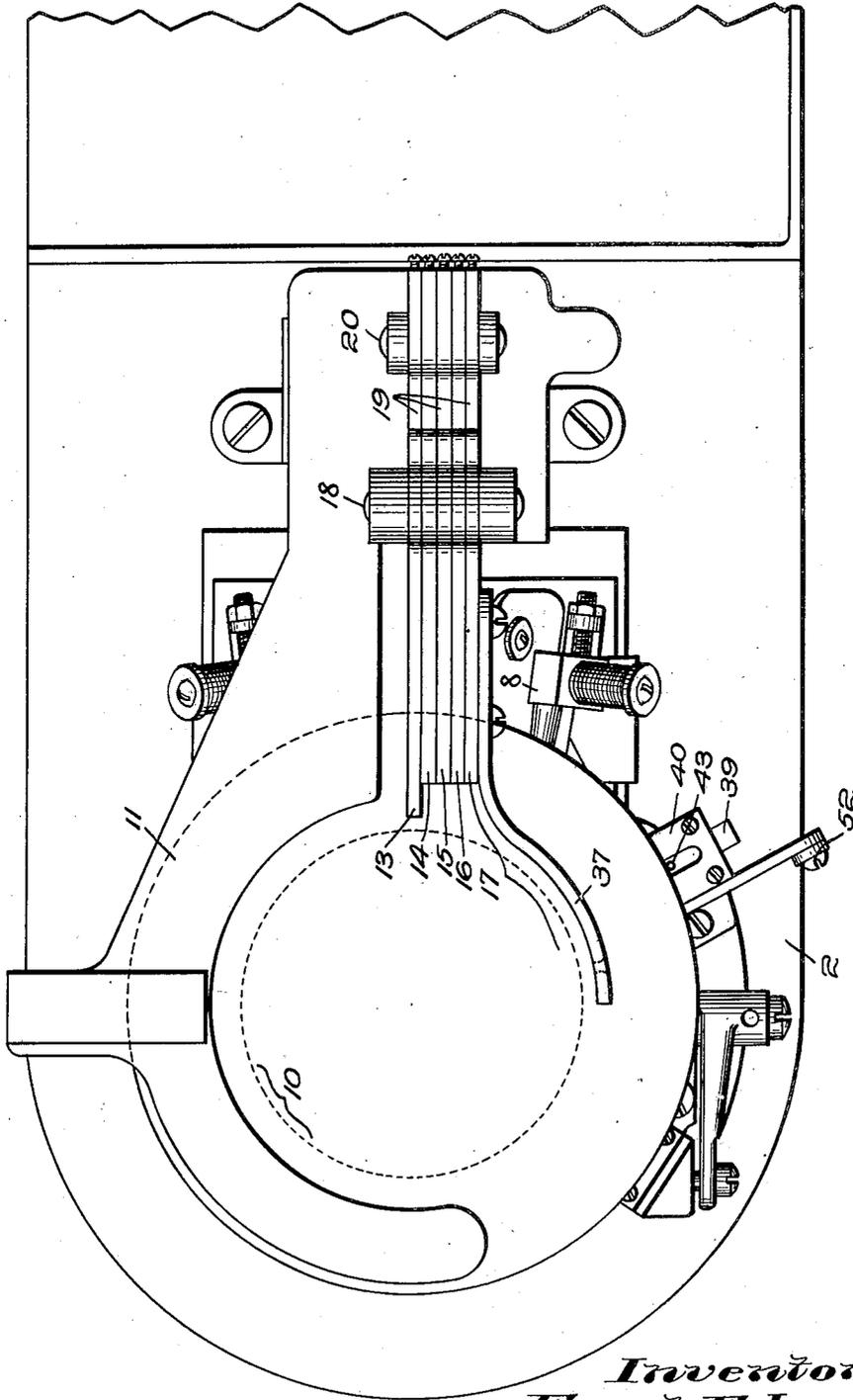
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Fig. 2.



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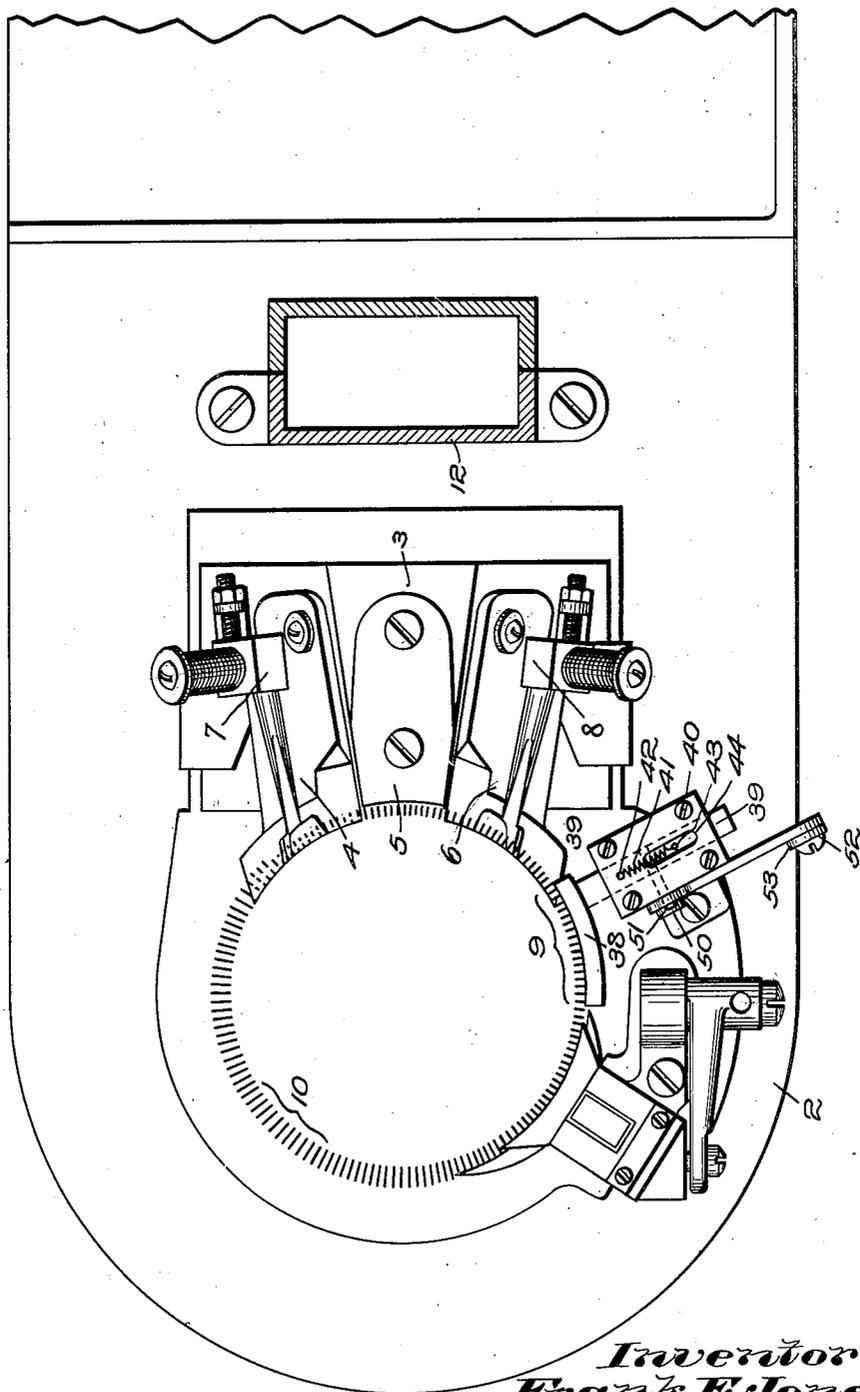
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Fig. 3.



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Fig. 4.

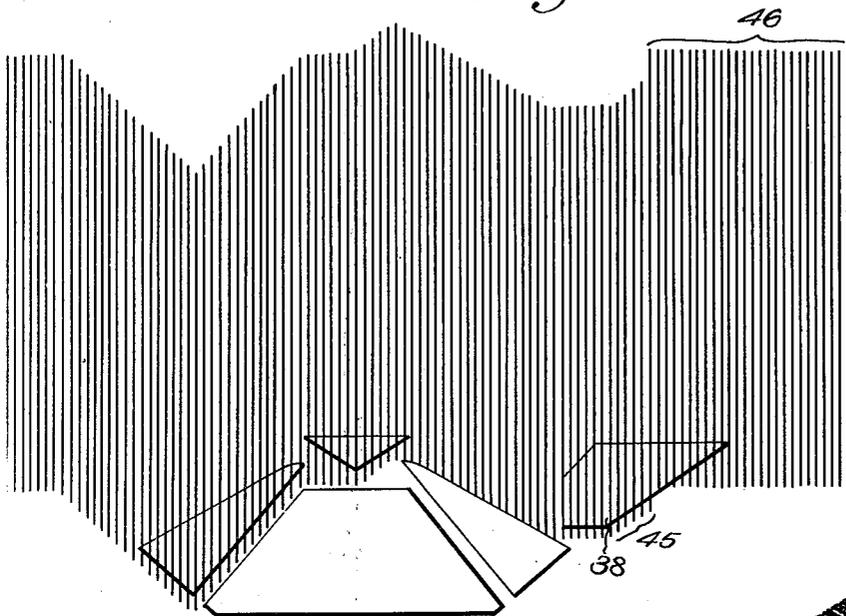


Fig. 5.

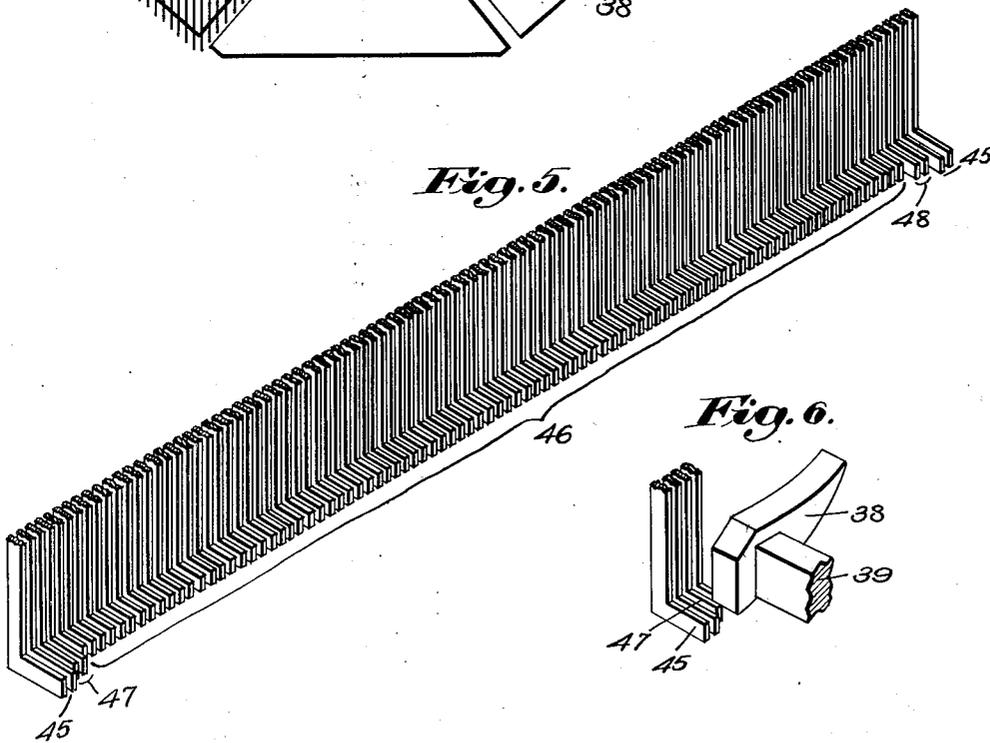
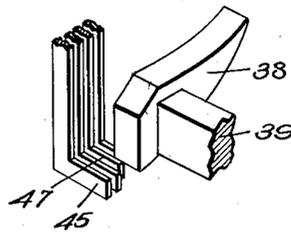


Fig. 6.



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Patented Nov. 18, 1924.

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UNITED STATES PATENT OFFICE.

FRANK E. JONES, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO HEMPHILL COMPANY, OF CENTRAL FALLS, RHODE ISLAND, A CORPORATION OF MASSACHUSETTS.

FEEDING MEANS FOR KNITTING MACHINES.

Application filed August 1, 1922. Serial No. 578,874.

To all whom it may concern:

Be it known that I, FRANK E. JONES, a citizen of the United States, and a resident of Pawtucket, in the county of Providence and State of Rhode Island, have invented an Improvement in Feeding Means 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 feeding means for knitting machines, and particularly to means for feeding a reinforcing yarn to a hosiery knitting machine, as, for example, for the high splice, or for the double sole.

In order that the principle of the invention may be readily understood, I have disclosed one embodiment thereof in the accompanying drawings, wherein—

Fig. 1 is a front elevation of a circular, hosiery, knitting machine having my invention applied thereto;

Fig. 2 is a plan view of the mechanism shown in Fig. 1;

Fig. 3 is a horizontal section taken below the sinker cam ring and the yarn fingers;

Fig. 4 is a somewhat diagrammatic view representing the knitting cams and the special cam acting to divide the needles;

Fig. 5 is a development of certain of the needles, but showing only the lower parts thereof; and

Fig. 6 is a perspective view of the needle dividing cam and one of the needles that has been acted on thereby.

My invention, relating as it does to circular hosiery knitting machines, may be applied to or embodied in various types of such machines, but I have chosen to represent the same as applied to a machine of the well known Banner type disclosed in the patent to Joshua D. Hemphill, No. 933,443, dated December 7, 1909. In this type of machine, the needle cylinder is cylindrical and rotates while the cams remain stationary, and although the machine disclosed is for the purpose of producing hosiery, it is not necessarily limited to such class of work. I will, however, describe my invention as applied to a machine of the said type without in all respects limiting it thereto.

Generally speaking, the machine includes a rotating needle cylinder 1 mounted on a

suitable table 2 constituting a part of the frame of the machine and, as is customary in this type of machine, said cylinder is arranged to be rotated and reciprocated to form the tubular and heel and toe portions of a stocking respectively. The means for effecting the rotary and reciprocating movements are substantially the same as those shown and described in the said Hemphill patent, and being well known need no further description.

Surrounding the needle cylinder 1 is a cam carrier which may be, except as hereinafter stated, of usual construction. At one side of the needle cylinder is located a cam block 3 having thereon the usual cams, certain of which are indicated at 4, 5, 6 in Fig. 3. Upon said cam block are mounted the narrowing pickers 7, 8, and opposite thereto is mounted the widening picker of usual type. The needles are arranged in a circular series, and as shown most clearly in Fig. 3 substantially one half the needles, namely, the heel and toe needles, are indicated at 9 as having short butts. The remaining needles excepting preferably about four of intermediate length, hereinafter referred to, are long butt needles and are indicated at 10 and are termed the instep needles. Prior to the formation of the heel and toe, the instep needles are thrown out of action as a series in usual manner, and the narrowing and widening are effected upon the short butt needles in the customary manner. The needles may be of any suitable construction, either latch needles or spring beard needles, but desirably I employ spring beard needles. At the rear of the machine upon a suitable post or standard is mounted a partial or complete ring member 11 shown most clearly in Fig. 2. If the needles be of the spring beard type, the member 11 is, as shown, of a partial ring shape, and is so mounted as to be swung out of the way to permit transferring, or for other purposes. When swung down into position, it is supported in part by the post 12 extending upward from the bed plate 2, as clearly shown in Fig. 1. Desirably carried by the ring member 11 are a series of yarn guides 13, 14, 15, 16 and 17. The said yarn guides are adapted respectively to supply yarn for different parts of the stocking, as, for example, the garter top, the leg, the heel and toe, the foot portion, and the re-

enforcing yarn for both the high splice and the sole. Each of said yarn guides is pivoted at 18 upon the ring member 11, so that they can all be swung up out of the way with the said ring member. Each of said yarn guides is provided with a rear extension adapted to be acted upon by a lever 19 pivoted at 20, and it is acted upon by a coiled spring 21. Thus, the normal tendency of each lever 19 is to throw its yarn guide down into functioning position. In order to move the yarn guide out of action at the desired times, I provide a series of levers, two of which are indicated at 22, 23 in Fig. 1 and are pivoted upon a stud 24 in the post or bracket 12. From the outer ends of said series of levers, two of which are indicated at 22, 23, there extend downward wires or other suitable connections to a series of levers 25, 26, 27, 28, 29, which ride upon cams 30, 31, 32, 33, 34 upon the cam disk 35 carried by the cam shaft 36 in the usual manner, and being described in the said Hemphill patent, it is not necessary more fully to explain. The said yarn guides 13, 14, 15, 16 are of substantially the same length, but the yarn guide 17 has attached to the body or main portion thereof a curved extension 37 shown most clearly in Fig. 2 and having a yarn supply opening near its end. The said yarn is adapted to be introduced to the needles for the formation of the high splice or for the sole, but only to the short butt needles, and preferably to about four needles having butts of intermediate lengths and which are in pairs at either end of the short butt series. The cam track pertaining to the elongated yarn guide 37 is of such shape as to permit said yarn guide to remain in action throughout the entire formation of the high splice and throughout the entire formation of the sole, and if desired also at other times. Since, however, the reinforcing yarn is at such times to be fed only to certain of the needles, as, for example, the short butt needles, and said needles of intermediate butt length, it is necessary to provide means to divide the needles or so control or move them that they cannot take the reinforcing yarn which is to be supplied only to the short butt needles and said intermediate butt length needles. To this end, I provide a special cam located substantially below and in line with the feeding end of the yarn guide 17 and adapted to act upon the butts of the long butt needles, so as to move them down out of action, and at such a time that they cannot take the reinforcing thread. The reinforcing thread therefore is laid against the stems of the needles below the beards thereof, and in such position is carried around to the place where the main thread is received by all the active needles. Thereupon the needles are carried down by the stitch cam, so that both

the main thread and the reinforcing thread are incorporated into the fabric in a manner which need not be more fully described. The special cam referred to is indicated at 38 in Figs. 3, 4 and 6. It is provided with a stem 39 mounted in a housing 40, so as to be moved radially in and out. A coil spring 41 is connected at 42 to the housing, and at the other end to a pin 43 extending up through a slot 44 in the housing. When the said cam 38 is in its inner position indicated in Fig. 3, it acts upon the butts of all the needles, and at such times depresses all the needles, so that none of them can take the yarn at the yarn guide 37, assuming that to remain down in functioning position at all times. The cam 38 may be moved radially outward into the position shown in Fig. 6, at which time it acts only upon the long butt needles, and thus will move them down as indicated at 45 in Fig. 4. The short butt needles indicated at 46 in Fig. 4 will not be effected by the special cam 38 when in its described outer radial position, nor will the intermediate butt length needles, indicated at 47, 48, and hence the entire series of short butt needles and the needles 47, 48 will receive the reinforcing yarn from the yarn guide 17 and carrying the same against their stems or under their beards will move with such yarn around to the main yarn guide where the main yarn will be received and both yarns will be incorporated into the fabric, as stated. The reinforcing yarn will be floated across the cylinder from about one end of the short butt series to the other, and after the stocking has been completed and removed from the machine, the floating yarns are cut.

In order to move the special cam 38 radially, any suitable means may be provided. Preferably I provide a bell crank lever 49 pivoted at 50 and having one arm connected at 51 to the stem of the special cam 38. To the end of the other arm of the lever 49 is pivotally connected at 52 a wire or rod 53 which extends downward to a lever 54 adapted to ride upon a suitable cam track 55 upon the cam shaft 36. The contour of the cam track 55 is desirably such as to move the special cam 38 radially outward during and for the formation of the foot, and it may be during the formation of the high splice. At such times, therefore, only the short butt series of needles and the needles 47, 48 will take the reinforcing yarn. At all other times the special cam 38 may be in its inner radial position indicated in Fig. 3, and then will act upon all the needles, so as to move them downward and prevent their taking yarn from the reinforcing yarn guide 17. This permits the reinforcing yarn guide 17 to be in its active or functioning position at all times. It is therefore

unnecessary to lift said guide out of action at any time, though if desired, the controlling cam path for said yarn guide 17 may be such as to elevate the yarn guide 17 out of action at times when it is not to introduce its reinforcing yarn. The yarn guide 17 for the reinforcing yarn I term the silent finger, inasmuch as it may be and desirably does remain down in functioning position at all times and does not have a rapid up and down movement during its introduction of the reinforcing yarn to one half the needles. Instead of moving the reinforcing yarn guide 17 up and down at such times, I divide the needles, moving downward those needles to which the reinforcing yarn is not supplied, so that they cannot take such yarn.

Having thus described one illustrative embodiment of my invention, 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. A circular, hosiery knitting machine comprising, in combination, a rotating needle cylinder, a circular series of needles carried thereby, substantially one half of them having short butts and substantially the remainder having long butts, a stationary cam ring having a main set of stitch cams, a series of pivoted main yarn guides for introducing the main yarns for the knitting of the stocking, a yarn guide pivoted co-axially with the other yarn guides but having a curved prolongation terminating at a point substantially remote from the main stitch cams, and a cam in substantially vertical alignment with the reinforcing yarn guide and positionable so as to act only upon the long butt needles, thereby to move them downward to escape taking the reinforcing yarn and permitting such yarn to be supplied only to the short butt needles and means to move said cam into different radial positions.

2. A circular hosiery knitting machine

comprising in combination, a rotating needle cylinder, a stationary cam ring, a circular series of needles substantially one half of which have short butts, the other half of which have long butts, there being several intermediate length butt needles between the long and short butts at either end of the short butt series, a plurality of yarn guides to supply main yarns during the knitting of the stockings, a reinforcing yarn guide of greater length and extending at its yarn feeding end, to a point at least substantially ninety degrees circumferentially of the needle cylinder from the point of introduction of the main yarns, all of said yarn guides being mounted in substantially face to face relation, and a cam located substantially in vertical alignment with the feeding end of the reinforcing yarn guide to divide the short and intermediate length butts from the long butts at said yarn guide, so that only the short butt and the intermediate butt needles receive the reinforcing yarn and carry the same to the main yarn guide and the knitting point.

3. A circular knitting machine comprising in combination, a needle cylinder, a cam ring having a main set of stitch cams, a circular series of needles carried by the same, said needles having contrasting butt formations respectively arranged in groups, a series of main yarn guides mounted in substantially face to face relation and movable into and out of action for introducing yarns, an additional yarn guide also mounted in substantially face to face relation with the said series of yarn guides but having a prolongation terminating at a point substantially remote from the main stitch cams and a cam in said substantially vertical alignment with the reinforcing yarn guide and positionable so as to act only upon the long butt needles, thereby to move them down to escape taking the reinforcing yarn and permitting said yarn to be supplied only to the short butt needles.

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

FRANK E. JONES.