

Oct. 17, 1961

A. BELFORD
KNITTING MACHINE

3,004,412

Filed March 2, 1956

7 Sheets-Sheet 1

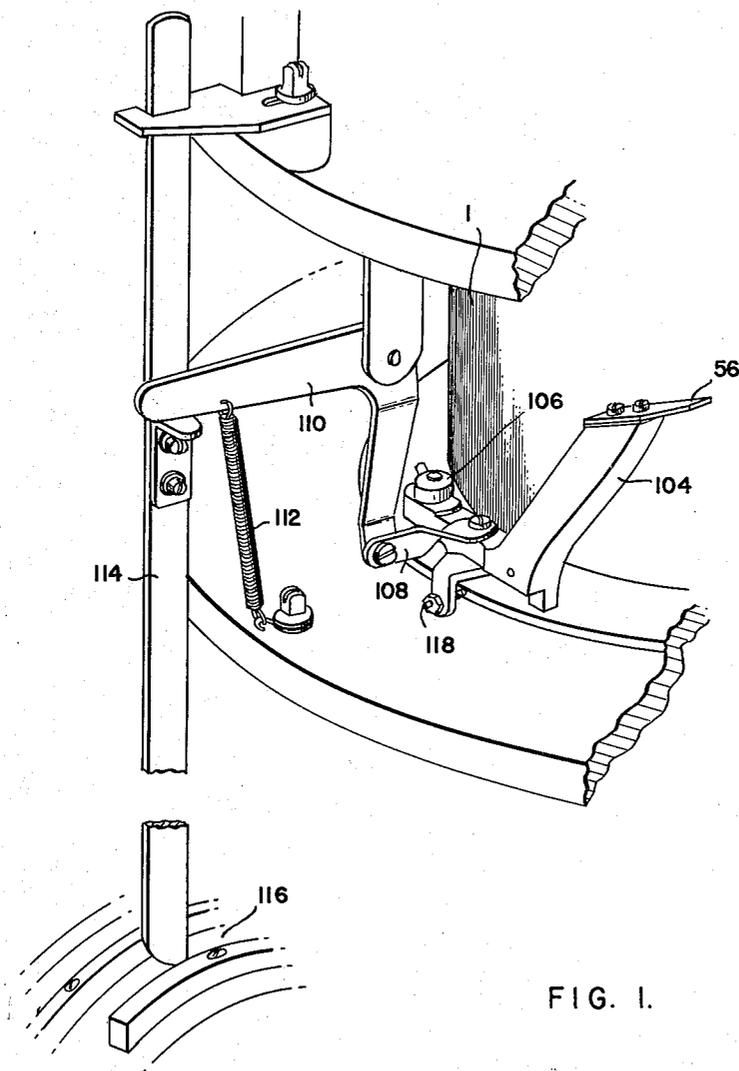


FIG. 1.

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7 Sheets-Sheet 2

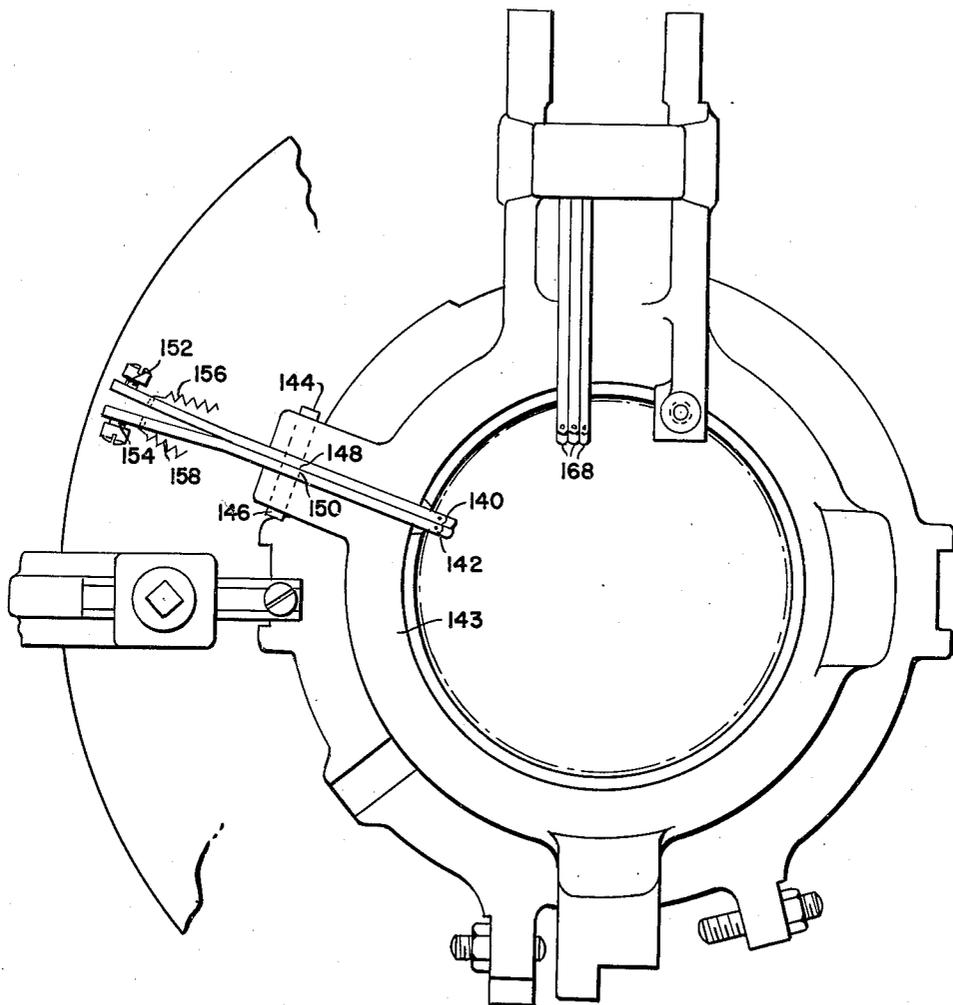


FIG. 2.

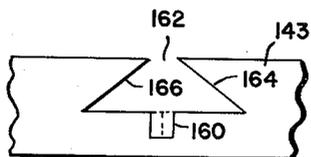


FIG. 3.

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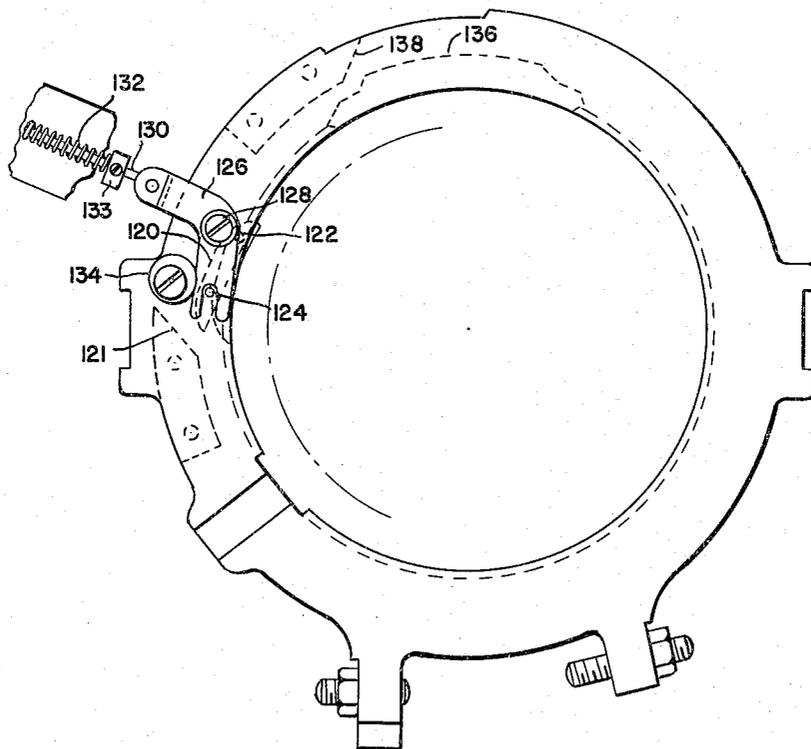


FIG. 4.

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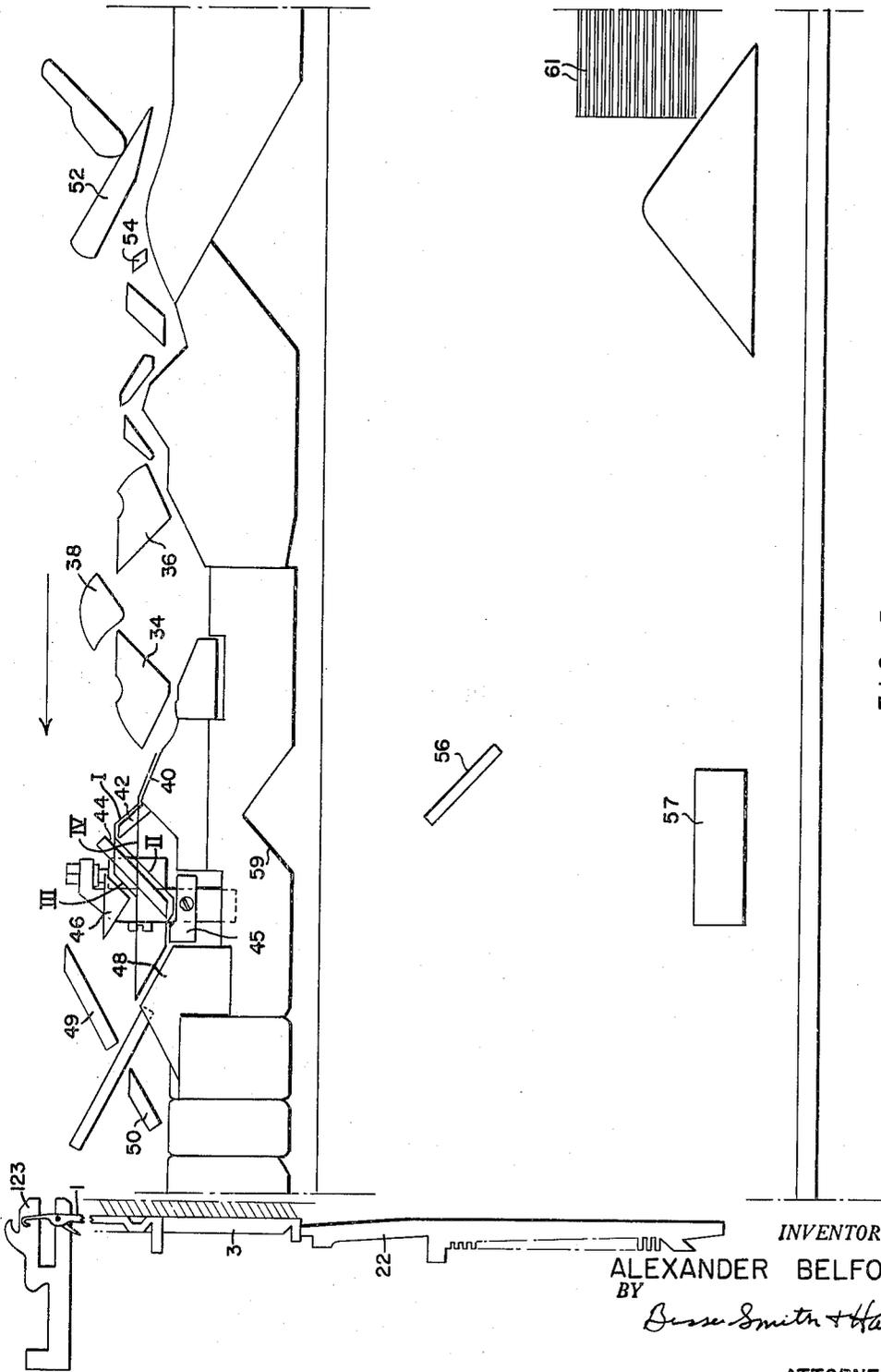


FIG. 5.

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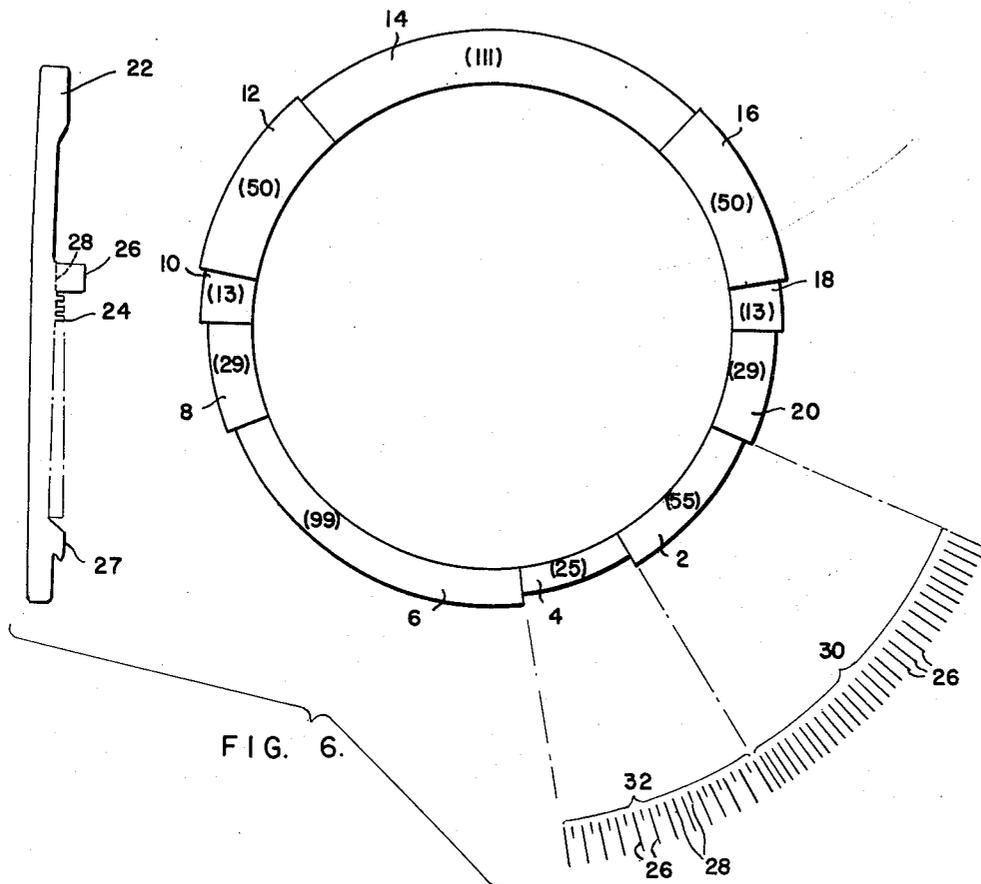


FIG. 6.

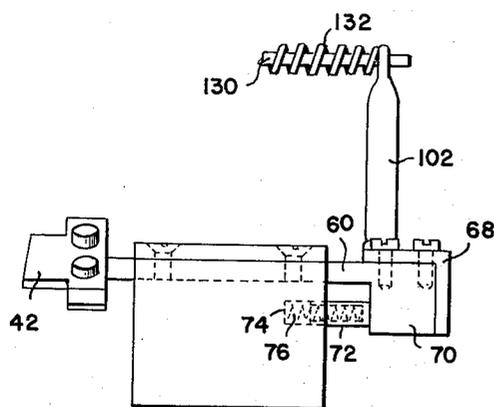


FIG. 9.

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3,004,412

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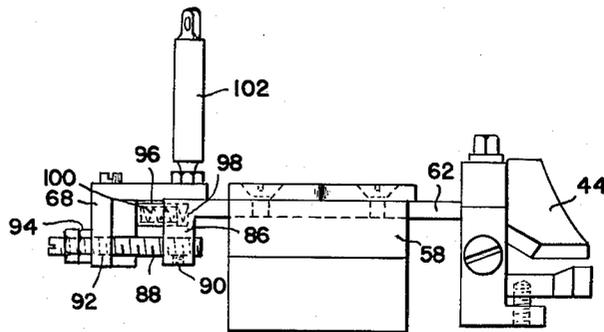


FIG. 8.

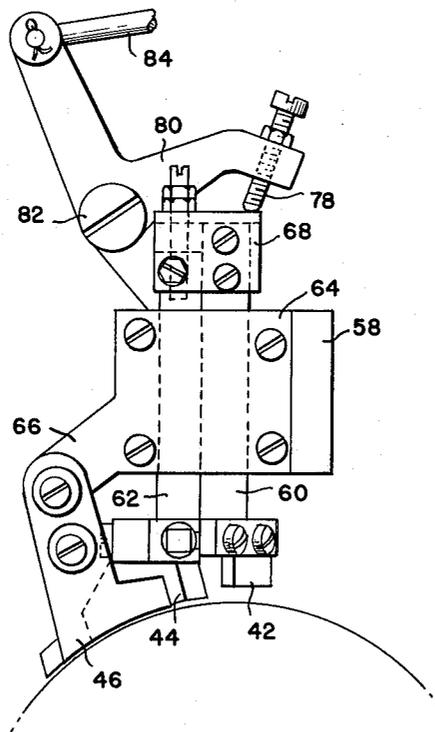


FIG. 7.

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3,004,412

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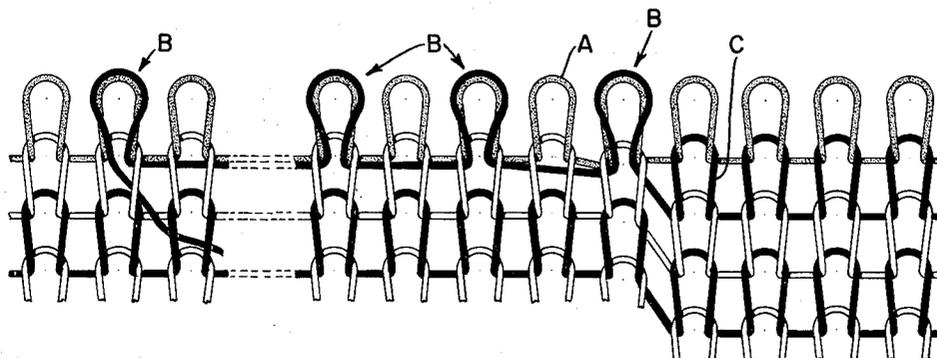


FIG. 10

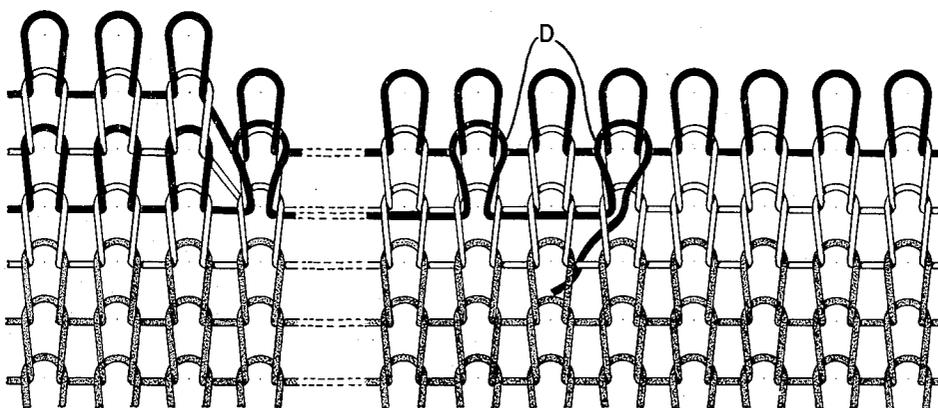


FIG. 11

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3,004,412

KNITTING MACHINE

Alexander Belford, Laconia, N.H., assignor to Scott & Williams, Incorporated, Laconia, N.H., a corporation of Massachusetts

Filed Mar. 2, 1956, Ser. No. 569,041
16 Claims. (Cl. 66-42)

This invention relates to knitting machines and has particular reference to two-feed knitting in fine gauge machines such as are used for the formation of ladies' sheer stockings.

The speed of production of hosiery may be considerably increased by two-feed knitting of the welt, shadow welt, leg and instep portions of the stockings, and while two-feed knitting of heels and toes is also possible, there are some advantages of simplicity in knitting heels and toes single-feed, particularly, in the matter of transforming machines normally designed for single-feed knitting of the entire stocking to machines capable of performing two-feed rotary knitting.

Two-feed knitting, furthermore, is desirable when stockings are to be formed of some of the so-called "stretch" yarns. Some of these yarns are commonly made with an unbalanced twist in the finer deniers. To produce a balanced fabric it is necessary, in such cases, to feed an S twist yarn at one feed of a two-feed machine and a Z twist yarn at the other feed.

In transformations from two-feed knitting to single-feed knitting and vice versa, difficulty is experienced in preventing the formation of "eyelets" which are caused when the free end of yarn slips back into either the first or last stitch formed depending upon whether the feed is being introduced or removed. The result is the formation of enlarged stitches giving the appearance of holes in the fabric.

One object of the present invention is to provide means in the form of an attachment for a single-feed machine which will transform it into a machine for two-feed rotary knitting.

Another object of the invention is to provide for the avoidance of "eyelets," particularly in going into or out of the heel and going into the ring toe.

The foregoing and other objects of the invention particularly relating to details of construction and operation will become apparent from the following description, read in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view showing, associated with a needle cylinder, a cam and operating means therefor designed to effect selective action on jack butts;

FIGURE 2 is a plan view showing in particular a latch ring and the main and auxiliary yarn feeding devices;

FIGURE 3 is a fragmentary elevation showing the formation of the latch ring in the vicinity of the second feed;

FIGURE 4 is a plan view showing the sinker cap of a machine and certain sinker cams thereon;

FIGURE 5 is an inside development of the cams acting upon the needles, intermediate jacks and pattern jacks;

FIGURE 6 is a diagram showing a typical arrangement of needles and jacks associated therewith, a jack being illustrated at the left of this diagram;

FIGURE 7 is a plan view showing certain cams and controlling means therefor;

FIGURE 8 is a side elevation of the assembly shown in FIGURE 7 viewed from the left hand side of FIGURE 7;

FIGURE 9 is a similar elevation but viewing the assembly of FIGURE 7 from the right hand side thereof;

FIGURE 10 is a diagrammatic illustration of a portion

of a stocking showing eyelet closing in going on the heel; and

FIGURE 11 is a similar illustration showing eyelet closing going off the heel.

Only so much of the knitting machine is illustrated in the drawings as involves the matters with which the present invention is concerned. It will be understood that the machine about to be described has the usual conventional elements of a machine of the type designed for the knitting of ladies' stockings, including the usual controlling devices whereby the various operations involved in a stocking formation are controlled. The invention is shown as applied to a knitting machine of the rotary cylinder type including a cylinder 1 in slots in which there are mounted the usual latch needles, intermediate jacks and pattern jacks. The machine is basically of the well-known Scott & Williams spiral type arranged for two-feed knitting and reference may be made to the patent to J. J. McDonough, No. 2,576,962, dated December 4, 1951, for basic aspects of the machine.

Reference may first be made to FIGURE 6 which diagrams the setup of needle butts for a typical operation. In this diagram it is assumed that there are 474 needles mounted in a cylinder having a 3¾ inch diameter. Such an arrangement may be used for the knitting of sheer stockings. The needles 1 are differentiated by butt lengths, and in the diagram the numbers of needles in various groups are indicated by the numbers enclosed in parentheses. In the typical example illustrated, there is a group of fifty-five needles indicated at 2 having, for example, butt lengths measuring 0.270 inch. Proceeding clockwise, this group 2 of needles is followed by a group of twenty-five needles indicated at 4 and provided with extra short 0.210 inch butts. Following this is a group 6 of ninety-nine needles having 0.270 inch butts. There are then, in succession, a group 8 of twenty-nine needles of 0.300 inch butts, a group 10 of thirteen needles of 0.338 inch butts, a group 12 of fifty needles of 0.390 inch butts, a group 14 of one hundred eleven needles of 0.338 inch butts, a group 16 of fifty needles of 0.390 inch butts, a group 18 of thirteen needles of 0.338 inch butts, and a group 20 of twenty-nine needles of 0.300 inch butts. The dimensional figures given are measured from the end of the butt to the back of each needle. It will, of course, be understood that what has just been specifically referred to is merely typical and given for an understanding of the invention, since the numbers of needles involved and the butt dimensions are subject to large variations depending upon the particular machines and the products desired. The needles of the groups 20, 2, 4, 6 and 8 are of the so-called "short butt" group knitting the rear of the stocking and, in part, the heel. The needles of the groups 10, 12, 14, 16 and 18 are of the "long butt" group knitting the instep and, in the present machine, the toe.

A pattern jack is illustrated at 22 and comprises the selectively removable pattern butts 24, an upper master butt 26 and a lower master butt 27. In the present machine there is a jack for each needle but these jacks are differentiated by having a master butt 26, or by having no butts at this location as shown at 28. The several types of jacks are associated with the needles as indicated at the lower right of FIGURE 6, wherein the butts 26 are shown as provided on a group of jacks 30 individually associated with the needles of the group 2, and jacks having butts 26 alternate with those without butts shown at 28 forming a group 32 associated with the needles of group 4. As indicated in the diagram, in the group indicated at 32 jacks with and without upper master butts alternate, butts 26 being provided on the jacks associated with the end needles of group 4, this group having an odd number, for example, 25 needles. As will appear, it is

in particular this group of jacks which operates to prevent eyelet formation. The jacks lacking master butts in groups other than 32 are not diagrammed though such jacks are associated with the other needles for conventional pattern formation.

Reference may next be made to FIGURE 5 which shows the cams controlling the needle butts and the intermediate jacks 3 and pattern jacks. At the main feed there are provided the forward stitch cam 34 and the reverse stitch cam 36 with the intermediate center cam 38. The needles during counterclockwise rotation of the needle cylinder pass toward the left as viewed in FIGURE 5, and needles which are lowered by stitch cam 34 are raised by cam 40. Following the rise of cam 40 there is provided a cam 42 followed by the auxiliary feed stitch cam 44 and a needle lowering cam 46. Below the cam 44 there is a landing cam 45 which slightly raises needles to relieve stitch strain. A needle raising cam 48 is provided, and this is followed by a cam 50 arranged to lower needles and a switch cam 52 arranged to raise needles above the cams at the main feed. The cam 52 is followed by a raising cam 54 which will be described hereafter. Besides the cams particularly mentioned there are others acting upon the needle butts and there are also provided the usual raising and lowering pickers which are not illustrated. Of the cams mentioned, various are movable as will appear hereafter, the movements being in most instances controlled in conventional fashions from the main cam drum of the machine. Certain of the cams are specially mounted and these mountings will be described.

A special cam 56 is provided for action upon the upper master butts of pattern jacks and will be described in greater detail later. It may be here remarked that the cam 56 serves to effect the rise of needles slightly in advance of rise which may be effected by cam 42, thus permitting cam 42 to be moved inwardly as will later appear. A cam 59 follows the location of cam 56 and provides for the lowering of intermediate jacks. A guard cam 57 is provided to prevent by engagement with the lower master butts 27 thereof, the rocking outwardly of pattern jacks, the rocking being prevented during the raising of pattern jacks by cam 56 and the lowering thereof by cam 59. The usual pattern jack selecting cams 61 are provided in association with other cams which act conventionally on the pattern jacks to effect patterning and intermediate jacks.

Reference may now be made particularly to FIGURES 7, 8 and 9 which show the means providing for mounting and operation of the cams 42 and 44 and for the mounting of the fixed cam 46. The cams 42 and 44 are respectively mounted on slides 60 and 62 arranged to slide radially in a guideway provided by a fixed block 58 and a cover plate 64 which is provided with a lateral extension 66 to serve for the fixed mounting of cam 46. A bracket 68 is secured to the outer end of slide 60 which is provided with an enlarged end 70 with which engages a sleeve 72 slidable in a bore 74 in the block 58 and enclosing a spring 76 under compression which urges the slide 60 outwardly. An adjustable screw 78 mounted in one arm of a bell crank 80 which is pivoted to the frame at 82 is arranged to engage the bracket 68 to move it inwardly against the action of spring 76 through a link 84 which is operated in conventional fashion from the main cam drum. The downwardly extending outer end 86 of slide 62 has threaded therein a stop screw 88 which is secured in position by a set screw 90. The inner end of this stop screw by engagement with block 58 limits the inward movement of slide 62, adjustment being desirably so made that the cam 44 just clears the needle cylinder when it is in its innermost position. The screw 88 passes freely through an opening 92 in the bracket 68, and exteriorly of that bracket is provided with a nut 94 associated with a lock nut, the arrangement

being such that movement of the slide 60 outwardly will concurrently move the slide 62. A sleeve 96 received in a bore 98 in the slide 62 and enclosing a compression spring 100 serves to urge the slide 62 inwardly relatively to the slide 60 by abutment with the portion 70 of the last mentioned slide. As will be evident from what has just been described, the spring 76 normally urges both slides outwardly. As slide 60 is moved inwardly by the action of screw 78, the slide 62 is caused to move therewith by the action of spring 100, but when the inner end of screw 88 engages the block 58 to arrest the slide 62, the slide 60 may be moved still further inwardly, the spring 100 yielding to permit this to occur.

A post 102 extends upwardly from the bracket 68 for a purpose hereafter described.

Referring to FIGURE 1, the cam 56 is carried by a lever 104 pivoted at 106 to the frame and arranged to be operated by a link 108 connected to the depending arm of the bell crank 110 which is urged counterclockwise as viewed in FIGURE 1 by a spring 112 against the action of which it may be moved by a push rod 114 engageable by cams on the main cam drum 116. A stop screw 118 secured in the lever 104 and engaging a portion of the machine frame limits the inward movement of cam 56 under the action of spring 112.

The sinker cap of the machine as shown in FIGURE 4 mounts on pivot 122 a sinker withdrawing cam 120 which is provided with an upwardly extending pin 124 engageable by the forked arm of a lever 126 which is pivoted at 128 and connected to a link 130 which slides through an opening in the upper end of the post 102, a spring 132 being located between the post 102 and a collar 133 secured to the link 130 so that as the post 102 moves inwardly the compression of the spring will serve to rock the cam 120 outwardly to effect withdrawal of sinkers 123 at the auxiliary feed. An eccentric washer 134 engageable by lever 126 limits the outermost position of cam 120. A cam 121 following cam 120 serves to return the sinkers inwardly. The cams 136 and 138 at the main feed perform their usual functions in imparting a wave to the sinkers during the knitting operation.

Referring to FIGURE 2, the auxiliary yarn fingers are indicated at 140 and 142 and are pivoted on the eccentric inner ends 148 and 150 of pins 144 and 146 which may be adjusted to effect proper positioning radially of the fingers. The fingers are arranged to be raised to inactive position by means of wires 152 and 154 actuated from the main cam drum, the fingers being urged to lowered active position by springs 156 and 158. As indicated in FIGURE 3, the latch ring 143 is provided with a socket 160 in position to receive the fingers 140 and 142 when each is active. The fingers rise to inactive position through the opening 162 in the latch ring, which opening is flanked by sloping edges 164 and 166 provided for the purpose of completely opening the latches of needles which may be riding high with their latches partially opened by centrifugal force.

The yarn feeding fingers at the main feed are indicated at 168. The main and auxiliary feeds in this machine are provided with separate clamp and cutter mechanisms, individually of conventional type, which, however, are operated simultaneously. Since these clamping and cutting mechanisms are conventional they are not illustrated herein.

The machine illustrated is of the type having a conventional dial carrying welt jacks for the formation of a turned welt. The operation involved is, however, generally conventional with the exception of introduction of the second feed, and accordingly the welt-forming devices are not shown in detail.

The operations involved in the knitting of a complete stocking are the following, though it will be obvious that various changes may be made in the conventional

aspects of stocking formation if special products are desired.

The stocking may be started on bare needles in the usual way, that is yarn is dropped in at the main feed and fed to alternate needles only for one revolution starting on the first instep needle of group 10. During the second revolution all of the needles are caused to pass the main feed and take yarn. During the third revolution, intermediate needles are again moved to welt level prior to the main feed so that alternate needles only take yarn. The welt jacks in the dial are projected between the alternate needles at the start of this revolution so that the alternate needles draw their stitches over the jacks for one revolution. At the beginning of the fourth revolution the dial jacks are withdrawn from action but alternate needles only continue to knit. What has just been described is conventional and details need not be given.

During the last half of the fourth revolution just mentioned the clearing cam 42 and the auxiliary feed stitch cam 44 are moved toward the cylinder so that these cams just miss the butts of the needles of group 6. This action is effected by screw 78 which acts on the slide, the slide 62 being moved through the action of compression spring 100. Through the action of post 102 and compression spring 132 the cam 120 is rocked outwardly before the cams 42 and 44 begin to act on the butts of the needles of group 8 and consequently the cam 120 is active to withdraw sinkers at the auxiliary feed. Simultaneously with these movements of the cams the yarn finger 140 is rendered active so that the first needle of group 8 takes the yarn and passes down the stitch cam 44 to knit. No effort need be made at this time to tie the end of the entering yarn to the fabric since eyelet formation to a noticeable extent is not involved.

During the fifth revolution all of the needles knit at the main feed and also at the auxiliary feed and this action continues through the remainder of the welt formation, the transfer and the shadow welt which follows.

Upon completion of the shadow welt yarn changes are effected at both the main feed and the auxiliary feed, yarn finger 142 going into action at the latter, and normal overlap at both feeds takes place. The main and auxiliary clamps and cutters operate in conventional fashion. The two-feed knitting of the leg then continues, involving no special operations.

In the last revolution in the formation of the leg and during which the instep needles comprising groups 8, 10, 12, 14, 16, 18 and 20 are raised to idle position by the cam 52, the auxiliary feed is withdrawn as follows:

At the beginning of this revolution and prior to the arrival of the needles of group 2 at the position of cam 56, cam 56 is inserted to engage butts 26 of the pattern jacks. As the first of the needles of group 2 passes the position of cam 42, rising above this cam (along path I, FIGURE 5) without engagement due to the action of cam 56 which, as above noted, provides an earlier rise than would be effected by cam 42, this cam 42 is withdrawn and cam 44 is withdrawn just sufficiently to miss the butts of the needles of group 4. The adjustment of the nut 94 on screw 88 is such that when cam 44 is thus withdrawn, cam 42 will be withdrawn sufficiently to miss the butts of the needles of group 6. Though these cams 42 and 44 are thus withdrawn, the movement of slide 60 is insufficient to provide withdrawal of sinker cam 120 from its outer position and consequently the sinkers are still withdrawn at the auxiliary feed. The needles of group 2 accordingly continue knitting, being cleared through the action of cam 56 and then passing down cam 44 (path II) taking and knitting the auxiliary yarn. The last needle of this group is the last to knit the auxiliary yarn at this phase of operation.

The alternate needles of group 4 which are associated with jacks having butts 26 are raised by cam 56 and take the yarn within their hooks. However, they miss cam 44

and are moved to tuck height by cam 46 along path III. The intermediate needles of group 4 associated with jacks without butts 26 and shown at 28 rise over cam 40 to tuck height but then move horizontally along path IV, failing to take the yarn. As a result the downward movement of the alternate needles by cam 46 effects wedging of the yarn at the backs of the hooks of the intermediate needles which were not raised by the action of cam 56.

The cam 44 is moved all the way out after passage by it of the last needle of group 2 and before the needles of group 6 reach its location and at this time cam 42 is completely withdrawn. This complete removal of cam 44 also renders cam 120 inactive, this cam being moved inwardly by the pressure of the sinkers. The needles of the group 6 which are associated with jacks without upper master butts remain at tuck level (path IV) defined by the rise over cam 40 and do not take the yarn, the auxiliary yarn being withdrawn and clamped and cut immediately following the passage of the needles of group 4.

On the first reverse stroke starting the heel, the yarn which was wedged between the alternate and intermediate needles of the group 4 is knit with the heel yarn A (which is substituted for the leg yarn) at the main feed in stitches B and is thus securely locked so that it cannot slide back into the last stitch C made at the auxiliary feed to allow that stitch to enlarge and form an eyelet. The fact that the yarn is in front of the alternate needles and in back of the intermediate needles provides a sufficient pinching action to hold it high in the hooks of these alternate needles so that it is in position to knit with the incoming heel yarn, being held above the latch ends and the sinker nebs so as not to be "cleared" as the needles rise over cam 34 to clear height. It may be noted that in this reverse stroke in which the end of the auxiliary yarn is knit it is knit in the "wrong" direction in the sense that it is knit starting at its free end with knitting taking place toward the end which is involved in stitches. However, it is possible to effect knitting in this fashion since this end of yarn is in the hooks of alternate needles while it lies in back of the intervening needles assuming a wavy formation which thus provides sufficient slack to enable it to knit without breaking. If it were held by all of the needles and not only by the alternate needles it would be broken in the attempt to knit it at the main feed.

Following this the knitting of the heel proceeds in conventional fashion from the heel yarn at the main feed only, the usual picking taking place to provide narrowing and widening. With the arrangement of needles shown a reduced heel is formed on the groups 2, 4, and 6 of the needles only, the needles of groups 8 and 20 being rendered inactive along with the instep needles forming the other half of the needles circle. This is conventional and has nothing to do with the present invention, which is equally applicable to the formation of heels on a full half of the needle circle. Obviously other types of heels may be provided in conventional fashion by proper differentiation of the needles.

During the knitting already described the cam 54 was out of action and cam 36 was in action to clear the stitches in the usual fashion during rotation and forward strokes of reciprocation. At the end of the last reverse stroke in knitting the heel the inactive instep needles are located above the cams 54 and 36 and these cams are moved, cam 36 being withdrawn from action and cam 54 being moved into action. This particular action is to provide a low latch clearing height as the needles begin to knit at the main feed similar to the action later described for proper operation in removing the auxiliary yarn at the beginning of the ring toe. Also, while the needle cylinder is stationary the action of the clutch is such that when rotary knitting begins, the cylinder is actually shifted 180° to later knit the toe on the long butt series of needles. During the first revolution following the completion of the heel and during which the instep needles

are lowered by cam 49 to resume knitting, the cam 56 is again moved in to effect raising of jacks having butts 26. The needles of group 2 are thus raised by the action of cam 56 and yarn from finger 142 is dropped in about the middle of this raised group of needles and the auxiliary yarn binder is opened to allow withdrawal of the yarn. The needles of group 2 following the rise due to cam 56 are lowered to tuck height by cam 46 (along path III) but since the successive needles are all in the same positions in the path of movement there is no action of significance with respect to the yarn. As the needles of the group 4 pass the cam 56 the alternate needles associated with jacks having butts 26 are raised to clear height along path I to take the yarn at the auxiliary feed. The intermediate needles are raised only by cam 40 and then pass horizontally along path IV by the cams 42 and 44. Cams 42 and 44 are moved inwardly toward the cylinder to just miss the butts of the needles of group 4 which are not raised by their jacks. Accordingly all of the needles of group 4 pass the cam 44 without action but the needles of this group which were raised by their jacks are depressed by cam 46 along path III, effecting wedging of the yarn in back of the intervening needles of group 4 as previously described with the result that the yarn is held high in the hooks of the alternate needles and prevented from falling below their latches.

The needles of group 6 are cleared by cam 42, take the auxiliary yarn, and are moved downwardly by cam 44 along path II to form stitches.

While the direction of the needle cylinder is now counterclockwise or that regularly used for rotary knitting, the new end of auxiliary yarn is held above the open latches of the alternate needles of group 4 and as the needles are all cleared by the low clearing cam 54 it knits with the yarn taken at the main feed as at D (FIGURE 11) to prevent an eyelet.

The knitting of the foot then proceeds at two feeds in usual fashion.

On the move going into the ring toe the jack cam 56 and the clear cam 42 and stitch cam 44 are moved out in the same manner as was described in connection with the move going into the heel. The auxiliary yarn is withdrawn in the same fashion, and the wedging of the yarn occurs as previously described. However, the taking of the yarn end at the auxiliary feed by the needles of group 4 is not followed by the knitting of the yarn end in a reverse reciprocation since the needle cylinder continues to revolve in the formation of the ring toe. This means that the yarn end is knit in the "right" direction, i.e., progressively from the end which is knit into the fabric toward its free end. This poses a problem as follows:

The last needle of the group 2 knits the auxiliary yarn and, as usual, lowers it to the level of the corresponding sinker ledge. The following needles of group 4 would be at tuck height, and even though the wedging action already described occurs, the yarn would extend upwardly from the last needle to knit it to the hook portions of the needles following the initial needles of the group 4 but in a direction causing it to cross the first of the needles of group 4 at a relatively low position. As the needles of group 4 would then be raised to clearing height over cam 36, the latch of the leading needle of this group would quite often rise above the auxiliary yarn extending thereacross with the resulting production of a float of the auxiliary yarn at this needle in the knitting of the main yarn at the main feed. In fact the float thus produced would not be a single needle float but a double needle float in view of the fact that the second needle of the group 4 failed to engage the yarn. The result would be that, in view of the knitting of the yarn end in the "right" direction that a slack would be provided permitting the yarn to be drawn into the last knit loop providing an objectionable eyelet. To avoid this the clearing cam 54 is substituted to effect clearing instead of the

cam 36, the cam 54 being only of sufficient height to raise the needles so as just to clear the drawn stitches without causing them to rise so high as possibly to cause the first needle of group 4 to raise its latch above the auxiliary yarn extending across it. The result is insurance that the yarn end will be knit on all of the needles of group 4 which engaged the yarn end within their hooks.

It may be noted that a similar action of clearance of the auxiliary yarn end by the latch of the first needle of group 4 might well have occurred at the beginning of the heel. However, if this does occur the situation is rectified by reason of the fact that the yarn end is knit in the "wrong" direction, the float then merely providing some slack yarn to go into the stitches formed at the main feed. Since the stitches are thus adequately locked in position there is no slack yarn to be drawn into an eyelet.

A similar action also occurs when the auxiliary feed is introduced going out of the heel but due to the provision of the low clearing cam 54 the yarn just introduced at this feed is prevented from getting below the open latch of the last needle of group 4 which might also cause an eyelet. It should be noted that here again the free end of yarn introduced at the auxiliary feed is carried to the main feed in the hooks of alternate needles and as previously described also knits in the "wrong" direction, but again its wavy formation provides sufficient slack to prevent breaking when it begins to knit on all of the needles.

Following the removal of the auxiliary yarn at the beginning of the ring toe, clearing cam 42 and stitch cam 44 are moved sufficiently far from the cylinder to miss the butts of all the needles.

The machine described knits the toe on the long butt series of needles and upon the move going into the toe, cam 50 is moved in to lower the needles of groups 10, 12, 14, 16 and 18 so that they pass below cam 52 which is moved in to raise groups 20, 2, 4, 6, and 8 above the knitting cams where they remain inactive during the toe. After passing under cam 52 the needles of the long butt series are cleared on cam 54, take yarn and knit the last half course prior to reciprocation. As the inactive short butt series of needles is above cams 54 and 36, cam 54 is taken out of action and cam 36 is moved into action so that formation of the toe may proceed in the usual fashion.

What is claimed is:

1. In a knitting machine, independent latch needles and means cooperating therewith for the formation of stitches including means for feeding yarns to the needles at at least two feeds, and means for effecting withdrawal of the yarn at one of said feeds following multiple feed knitting at both of said feeds with avoidance of eyelet formation in the fabric, the last means comprising means controlling one group of needles to take yarn and draw stitches thereof at one of said feeds with casting off of previously formed stitches carried thereby, means differentiating the needles of a group immediately following the first mentioned group, means causing certain needles of said group to take yarn at said feed and moving them in stitch drawing direction to a tuck level but insufficiently to cast off previously formed stitches carried thereby, means concurrently moving other needles of said following group flanking at least one of said needles to a tuck level, so that the yarn at said feed is held in the hooks of said certain needles by the wedging action resulting from its location about the backs of said other flanking needles, and means for thereafter knitting the portions of yarn held in the hooks of said certain needles at the other of said feeds.

2. Mechanism according to claim 1 in which said certain needles are alternate needles of their group and in which said other needles are intermediate needles of the same group.

3. Mechanism according to claim 2 in which said yarn withdrawal occurs in the knitting of a stocking in the transition between multiple feed knitting of an instep and single feed knitting of a ring toe.

4. Mechanism according to claim 2 in which at least trailing needles of the first mentioned group immediately preceding needles of the following group are moved just sufficiently to clear the stitches drawn at the first mentioned feed in the formation of the course in which the needles of the following group are differentiated as stated, thereby to prevent float formation at the first needle of said following group which seized yarn at the first mentioned feed.

5. Mechanism according to claim 2 in which the last mentioned knitting at the other of said feeds is effected in a direction of relative movement of the needles and feeds which is the reverse of that involved in said multiple feed knitting.

6. Mechanism according to claim 5 in which said yarn withdrawal occurs in the knitting of a stocking in the transition between multiple feed rotary knitting of a leg and single feed reciprocatory knitting of a heel.

7. Mechanism according to claim 1 in which the last mentioned knitting at the other of said feeds is effected in a direction of relative movement of the needles and feeds which is the reverse of that involved in said multiple feed knitting.

8. Mechanism according to claim 7 in which said yarn withdrawal occurs in the knitting of a stocking in the transition between multiple feed rotary knitting of a leg and single feed reciprocatory knitting of a heel.

9. Mechanism according to claim 1 in which said yarn withdrawal occurs in the knitting of a stocking in the transition between multiple feed knitting of an instep and single feed knitting of a ring toe.

10. Mechanism according to claim 1 in which at least trailing needles of the first mentioned group immediately preceding needles of the following group are moved just sufficiently to clear the stitches drawn at the first mentioned feed in the formation of the course in which the needles of the following group are differentiated as stated, thereby to prevent float formation at the first needle of said following group which seized yarn at the first mentioned feed.

11. In a knitting machine, independent latch needles and means cooperating therewith for the formation of stitches including means for feeding yarns to the needles at at least two feeds, and means for effecting introduction

of the yarn at one of said feeds following single feed knitting at the other of said feeds with avoidance of eyelet formation in the fabric, the last means comprising means differentiating the needles of a group, means causing certain needles of said group to take yarn at the first mentioned feed and moving them in stitch drawing direction to a tuck level but insufficiently to cast off previously formed stitches carried thereby, means concurrently moving other needles of the said group flanking at least one of said certain needles to a tuck level, so that the yarn at said feed is held in the hooks of said certain needles by the wedging action resulting from its location about the backs of said other flanking needles, and means for thereafter knitting the portions of yarn held in the hooks of said certain needles at the other of said feeds.

12. Mechanism according to claim 11 in which said certain needles are alternate needles of their group and in which said other needles are intermediate needles of the same group.

13. Mechanism according to claim 12 provided with means effecting said yarn introduction in the knitting of a stocking in the transition between single feed knitting of a heel and multiple feed knitting of an instep.

14. Mechanism according to claim 12 in which said needle differentiating means locates said other flanking needles at tuck level prior to the said movement of said certain needles in stitch drawing direction to tuck level.

15. Mechanism according to claim 11 provided with means effecting said yarn introduction in the knitting of a stocking in the transition between single feed knitting of a heel and multiple feed knitting of an instep.

16. Mechanism according to claim 11 in which said needle differentiating means locates said other flanking needles at tuck level prior to the said movement of said certain needles in stitch drawing direction to tuck level.

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