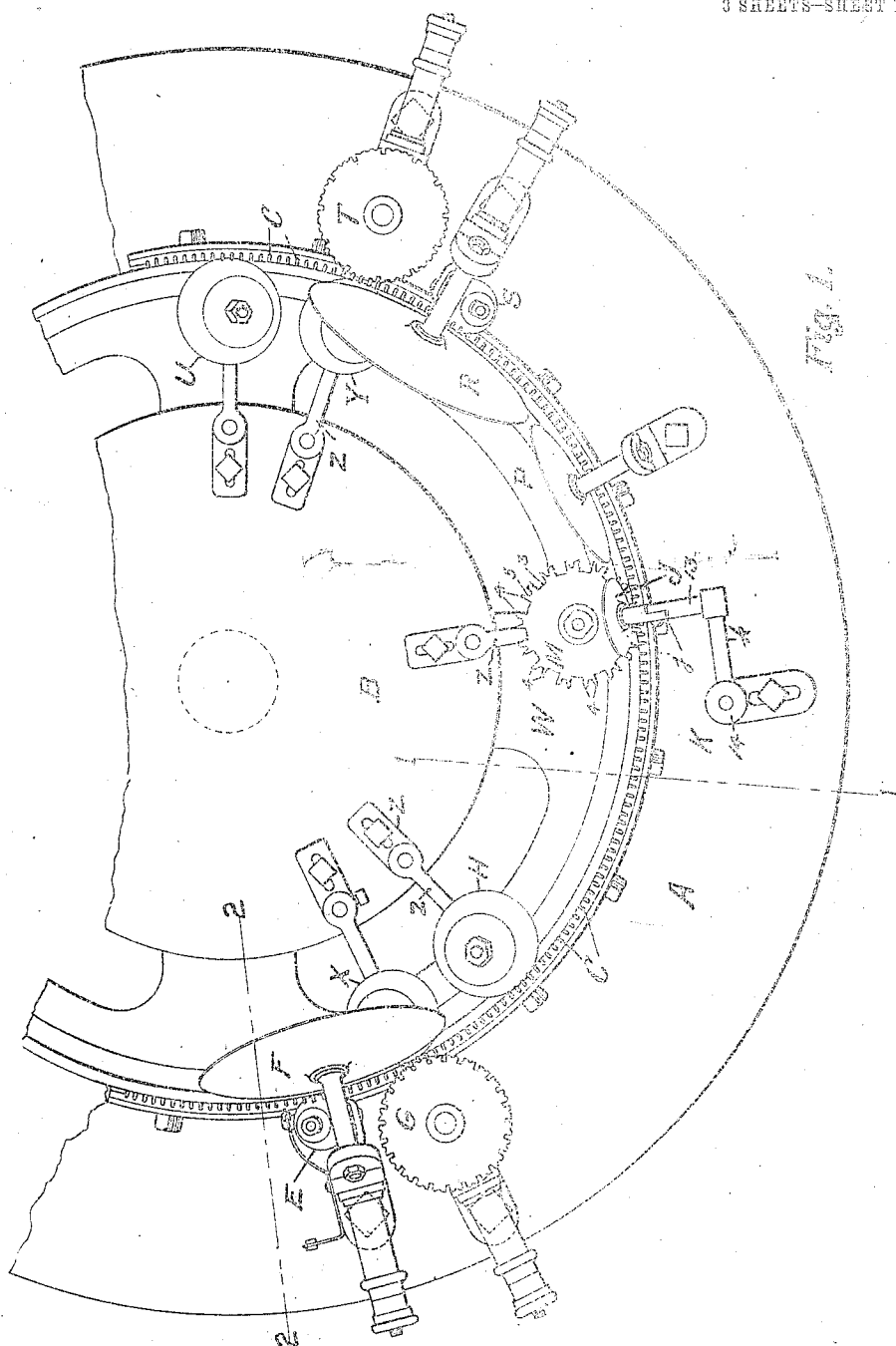


J. McNAMEE.
CIRCULAR SPRING NEEDLE KNITTING MACHINE.
APPLICATION FILED APR. 19, 1909.

1,050,970.

Patented Jan. 21, 1918.
3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

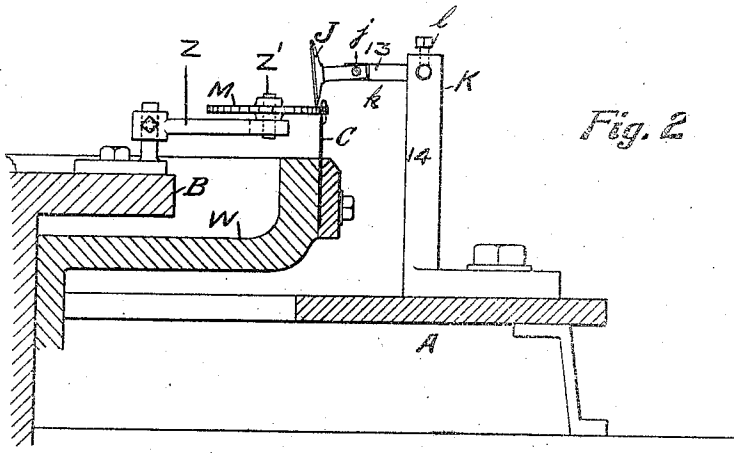


Fig. 2.

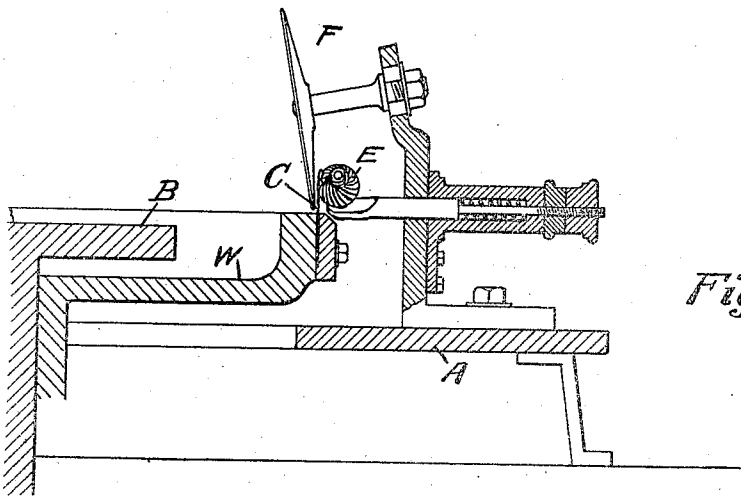


Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 7.



Fig. 8.

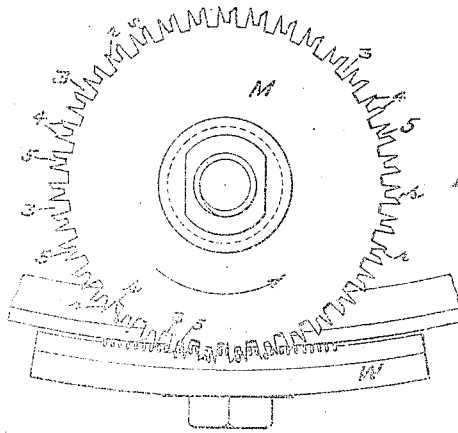


Fig. 4.

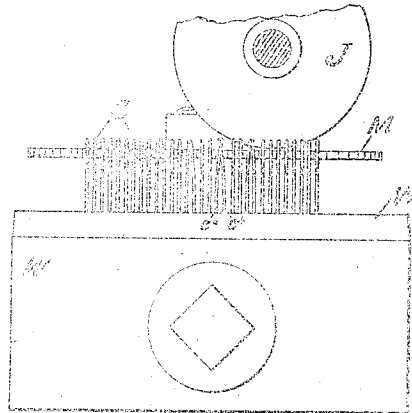


Fig. 5.

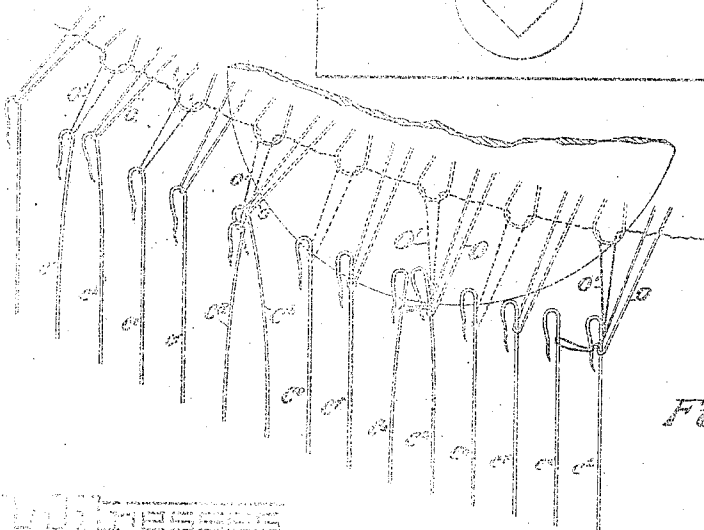


Fig. 6.

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UNITED STATES PATENT OFFICE.

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CIRCULAR SPRING-NEEDLE KNITTING-MACHINE.

1,050,970.

Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed April 19, 1909. Serial No. 490,867.

To all whom it may concern:

Be it known that I, JAMES McNAMEE, a citizen of the United States, residing at the city of Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Circular Spring-Needle Knitting-Machines, of which the following is a specification.

My invention relates to improvements in circular spring needle knitting machines, and the object of my invention is to provide a machine by the use of which fabric may be knitted in which there shall be enlarged and uniform openings without breaking or cutting the thread or yarn of which it is composed and without relieving any of the needles of their stitches or loops, except for the purpose of forming new stitches. By the use of my invention the stitches are not "transferred" as that term is understood in the trade, as will hereinafter appear. I attain this object by means of the mechanism illustrated in the accompanying drawing, in which:

Figure 1 is a plan of a portion of a circular spring needle knitting machine, showing particularly the inside plate B, needle cylinder W, and table A, with parts broken away, provided with my invention. Fig. 2 is a view along the line 1-1 of Fig. 1, showing a side elevation of the interchanging wheel M, and little push down wheel J, and cross section of the needle cylinder W, inside plate B, and table A, showing also the manner in which the interchanging wheel and the little push-down wheel J, are mounted and the relative positions of said wheels and needles. Fig. 3 is a view along the lines 2-2 of Fig. 1, showing a side elevation of the cloth wheel F, and the sinker or stitch wheel E, and needles C, and a cross section of the needle cylinder W, and the mounting of cloth and sinker wheels, also the relative positions of the cloth wheel, sinker wheel and the needles. Fig. 4 is an enlarged plan view of a portion of the interchanging wheel in engagement with the needles, and showing the tops of certain needles substantially "interchanged." Fig. 5 is a front elevation, enlarged, showing needles C, mounted in needle cylinder W, and engaged by the interchanging wheel M, and the small push-

down wheel J, (with parts broken away), and the relative positions of the needles, and said wheels. Fig. 6 is an enlarged detail view showing the position of the loops O, O', and needles C, C^a, C^b, C^c, C', at successive intervals, while the interchanging wheel M and little push-down wheel J, are operating in connection with them. Fig. 7 is a plan view of the plugged sinker wheel (or stitch wheel), as seen when lying flat and not when set at the angle at which it is operated. Fig. 8 is a detail horizontal section of the plugged sinker wheel shown in Fig. 7, when set at the angle at which it is operated, showing plugs p.

Similar letters refer to similar parts throughout the several views.

My invention is to be explained by a description of the parts of two feeds and what I call an "interchanging wheel and little push-down wheel, and their operation.

I adjustably mount the cloth wheel F, of the ordinary type in the usual manner upon the table A, the cloth wheel engaging the outside of the cloth within the perpendicular line of the needles, in the usual manner and for the usual purpose, viz.—to force the stitches, formed by the preceding feed, to the bottom of the needles and thus clearing the needles for engagement with the sinker or stitch wheel E. The sinker wheel E, is adjustably and yieldingly mounted upon the table A, and is located and adjusted in the usual manner, and differs from the ordinary sinker wheel in its construction and operation in that it is provided with "plugs" as that term is understood in the trade, in every other one of its recesses, into which the needles enter, these plugs fill the space, laterally, between their respective blades and extend outwardly from the annular wall supporting the blades sufficiently to close the beard of each needle entering a plugged recess. Thus the yarn will be carried by the plugged sinker wheel under the beard of every other one of the needles successively as they are engaged by the plugged sinker wheel and outside the beard of each needle whose beard is closed by a plug. In this way yarn is supplied by the sinker wheel as it engages each of the needles, the yarn as supplied to predetermined needles whose beards have been closed being a surplus to be taken up and used by a subse-

quent operation, as will hereinafter appear. In subsequent reference to this operation, the needles whose beards are closed and with reference to which the yarn is laid outside of the beards are referred to as "predetermined" needles, while the other needles under the beards of which the yarn is laid are referred to as "intermediate" needles.

The cut presser wheel G, shown in Fig. 1, is adjustably and yieldingly mounted upon the table A, and is located and operated in the usual manner. It is cut one and one, as the expression is used in the trade, and adjusted to coact with the plugged sinker wheel E, so as to close the beard of each "intermediate" needle under which yarn has been carried by the sinker wheel and not to close the beards of the "predetermined" needles which have been acted upon by the plugs in the plugged sinker wheel, in other words, the cut presser closes each beard that has not been closed by the plugged sinker wheel.

The landing wheel X, shown in Fig. 1, is of the ordinary type and is mounted upon the inside plate B, and is located, adjusted and operated in the ordinary manner, directly under the cut presser wheel G. The landing wheel X is used for the usual purpose, viz.,—while the cut presser is in engagement with the needles, to raise the stitches on the needles thus engaged to a position above the points of the beards.

The cast off wheel, H, shown in Fig. 1, is mounted upon the inside plate B, is of the ordinary type and is located, adjusted and operated in the usual manner and is used for the ordinary purpose, viz.,—raising the stitches on those needles whose beards have been closed by the cut presser G, to a position above the tops of the needles, thus leaving new stitches on those needles, and raising to the tops of the needles, but under the beards, those stitches which were not "pressed off" by the cut presser G. Thus it will be seen that a course of new stitches is formed on only every other one of the needles, and that the remainder of the needles in the cylinder have under their beards only stitches of a preceding course formed by a preceding feed. It will also be seen that loose yarn will extend from each new stitch or held loop to the adjoining new stitch or held loop on both sides, over and disconnected from the stitches of the preceding course, which were not cast off.

What I call an "interchanging wheel" M shown in Fig. 1, a side elevation of which is shown in Fig. 2 and by an enlarged plan view in Fig. 4, is a circular disk-like wheel of convenient diameter, provided alternately with successive slots 3, for receiving needles free and successive pairs of radial teeth 4, with intervening recesses 5, for engaging and confining needles, the teeth projecting from its periphery substantially as shown; a plan

view of said teeth with intervening recesses 5, and with slots, being best shown in Fig. 4. In the direction in which the cylinder turns, the forward tooth of each pair is provided with a needle engaging face *r*, at its inner wall, at an angle centerwardly and rearwardly from the radius of the wheel, substantially as shown, and the rear tooth of each pair is provided with a needle engaging face *s* at an angle outwardly and rearwardly from the inner wall of such rear tooth and the radius of the wheel substantially as shown. The centerward point of the recess 5 is substantially of a breadth to receive a single needle without binding and broadens as it proceeds from the body of the wheel, because of the angle of the face or wall *r*, as shown. The horizontally disposed interchanging wheel M (see Fig. 2) is adjustably mounted upon the inside plate B, by means of the ordinary horizontally disposed bracket or arm Z on the outer end of which is an upwardly projecting stub shaft Z' on which the wheel M is journaled. The interchanging wheel is adjusted at a point slightly and conveniently below the tops of the needles and in engagement with them. According to the "cut" of the wheels shown in the accompanying drawings and used herein for the purpose of explanation (although they may be varied for different designs of fabric) two needles are received free, i. e. in their ordinary positions, in the slots 3 and two adjacent needles are received and confined in the recesses 5.

A second cloth wheel R of the ordinary type is adjustably mounted in the usual manner upon the table A, which is adjusted and operated in the same manner and for the same purpose as cloth wheel F, as hereinbefore described.

The little push-down wheel J, a plan of which, adjusted, is shown in Fig. 1 and a side elevation of which, adjusted, is shown in Fig. 2, and a front elevation of which, with support broken away, is shown in Fig. 5, is a circular disk-like wheel of about two inches in diameter, or other convenient dimension, and is journaled on a horizontally disposed arm 13, adjustably fastened to the upwardly projecting standard 14, removably mounted upon the table A. The little push-down wheel is adjusted with reference to the needles engaged by the interchanging wheel M, with its periphery conveniently below their tops, so as to engage the cloth slightly within the perpendicular line of the needles and conveniently rearwardly (as the cylinder turns) of the needles thus engaged, substantially as shown in Fig. 1 and Fig. 2. There is also provided a push-down wheel P between the little push-down wheel J and the cloth wheel R to retain or hold down the stitches below the tops of the needles until they reach the cloth wheel R.

A plain sinker wheel S, of the ordinary type is adjustably and yieldingly mounted upon the table A, and is located and adjusted in the usual manner, with reference to the cloth wheel R.

Following (as the cylinder turns) the cloth wheel R, and sinker wheel S, a cut presser wheel T, shown in Fig. 1, is adjustably and yieldingly mounted upon the table A, and is located and operated in the usual manner. It is cut one and three, as that expression is understood in the trade, so as to close the beards of three successive needles and not to close the beard of each fourth needle, and is adjusted to coact with the interchanging wheel M, and not to "press off" or close the beard of a second needle entering a recess 5. (Fig. 4).

The landing wheel Y, shown in Fig. 1, is of the ordinary type and mounted upon the inside plate B, and is located, adjusted and operated in the ordinary manner directly under the cut presser T, and for the usual purposes, as hereinbefore stated with reference to the landing wheel X.

The cast-off wheel U, following the landing wheel Y, is mounted upon the inside plate B, is of the ordinary type and is located, adjusted and operated in the usual manner and for the usual purposes, as hereinbefore stated with reference to cast-off wheel H.

The operation of my invention is as follows: As the stitches on the needles, formed by a preceding feed, are pressed down by the cloth wheel F, yarn is carried by the plugged sinker wheel E, under the beard of every other one of the needles and outside of the beard of each other needle; thus loose yarn is provided outside of the beard of each "predetermined" needle acted upon by a plug in the plugged sinker wheel, which is utilized by a subsequent operation. As the needles thus acted upon by the plugged sinker wheel pass on their beards are engaged by the cut presser G, which closes the beard of each "intermediate" needle under whose beard yarn has been carried by the plugged sinker wheel but which does not close the beards of those "predetermined" needles which were closed by the plugs in the plugged sinker wheel. While the beards of the needles are thus engaged by the cut presser, the landing wheel X, engages the needles and stitches thereon and raises all of the stitches on the needles thus engaged to a point on the needles above the points of said beards, thus every other one of such stitches will be outside of the beards while the remainder of such stitches will be under the beards. The needles and stitches are next engaged by the cast-off wheel H, which rises to the tops of the needles and under the beards whose stitches which were pre-

viously thereon and which were not "pressed-off" by the cut presser and raises over the tops and off the needles those stitches which were pressed off by the cut presser, leaving new stitches on those thus pressed off and continuing on the needles, whose beards were not closed by the cut presser, the stitches previously formed thereon. By this operation new stitches or held loops are formed on those needles whose beards have been closed by the cut presser, and the loose yarn furnished by the sinker wheel floats back of those needles which have not been closed by the cut presser and thus forms free surplus or slack. The needles are next engaged on the inside by the interchanging wheel M. As the needle cylinder W, and the interchanging wheel rotate, two adjacent needles ride into and are received free in a slot 3, (Fig. 4) and the two adjacent and succeeding needles are directed into, received and confined in a recess 5. Two needles are directed into a recess, as follows: The needle engaging face *r*, engages the first of two adjacent needles to enter a recess 5, slightly retarding and springing it back and the needle engaging face *s*, engages the second of the two last mentioned needles springing it slightly outward and forward, so that as the cylinder and interchanging wheel rotate and the face *s* intersects the line through the centers of the cylinder and interchanging wheel at an angle sufficiently obtuse, the said second needle is forced into the recess 5, along with and against, but after, the first of said last mentioned two needles, by the inward spring of the said second needle, the forward movement of the cylinder and the said tooth 4. Thus the back of the second needle to enter a recess 5, will bear against the front of the beard of the first needle so entering the same recess, and the said second needle will be substantially flush with the intersection of the inner wall of the tooth 4, and the face *s*. It will be observed in this connection that the needle engaging devices of the interchanging wheel, by reason of the location of said wheel within the circular path of the needles, and the smaller diameter of the interchanging wheel, while the latter is mounted in a plane parallel with the path of the needles, approach the needles to the point of intersection, engage the needles, move with the needles for a prescribed distance, and then recede from the path of the needles, liberating them to permit of their resuming their relative normal positions. Moreover, it will be noted that as each needle engaging device on the interchanging wheel reaches the point of intersection with the path of the needles, the forward needle engaging face *r* is deflected rearwardly and inwardly to effect an in-

ward deflection of the needle as the latter is retarded and thus sprung to the rear, with reference to the direction of movement of the series of needles. On the other hand, the rearward needle engaging face *s*, being disposed at an angle outwardly and rearwardly from the inner wall of the adjacent tooth and the radius of the wheel, tends to force the rearward needle of the pair engaged by the needle engaging device outward and forward. The abrupt bevel at the outer extremity of the wall *s* serves to facilitate the release of the engaged needles as each needle engaging device begins to recede from the path of the needles. This effect of retarding and inwardly deflecting the forward of a pair of needles and of deflecting outwardly and advancing the rearward of said engaged needles is due to the relative positions of the needle engaging faces which converge inwardly of the interchanging wheel, the forward needle engaging face being disposed obliquely or at an inclination to the radius of the interchanging wheel while the rearward engaging face is disposed substantially on a radius of the interchanging wheel, and the result of this action of the needle engaging faces upon the forward and rearward of two engaged adjacent needles is to cause the needles to intersect each other below their upper extremities or terminals on a plane radial of the path of the needles. The interchanging wheel is "set" to co-act with the plugged sinker wheel E, and the cut presser G, so that a needle to enter a recess 5, first shall be a needle under whose beard no yarn has been fed by the plugged sinker wheel E, and whose beard was not closed by the cut presser G, and also so that the second needle to be forced into the same recess shall be a needle under whose beard yarn was fed by the plugged sinker wheel and whose beard was closed by the cut presser G. Thus the outer of the two needles in a recess 5, will have on it a new stitch, and the adjacent needles on each side of it in the cylinder will have under their beards only stitches of a preceding course. As the needle cylinder and the interchanging wheel continue to rotate, the top of the forward needle (of the two confined) is sprung backward and the top of the rearward of said two needles is sprung forward (substantially as shown in Figs. 4, 5 and 6), so that they become crossed and their tops substantially interchanged by reason of the forward movement of the needle cylinder W, and the interchanging wheel M, and the flexibility of the needles. At this point the little push-down wheel J, becomes effective. It is so adjusted within the perpendicular line of the needles with the periphery slightly and conveniently below the tops of the needles

that it engages the cloth on the outside and conveniently rearward of the needles thus crossed that it pushes or forces the stitches and cloth on the needles thus crossed inward and downward to a point below the tops of those needles. As the needle cylinder and interchanging wheel continue to move forward and the needles thus confined have passed slightly forward of the line of the centers of the needle cylinder and the interchanging wheel the needles are released and resume their usual positions, by reason of the forward movement of the cylinder and interchanging wheel, the formation of the teeth of said wheel as shown and the resiliency of the needles. It is thus seen that by the operation of the interchanging wheel in crossing the needles as described and by the operation of the little push-down wheel J, in forcing the stitches inward and down below the tops of the needles while crossed, and holding them there while said needles are crossed that the loop or stitch of the second needle entering a recess 5, is carried or drawn over and outside of the needle thus entering said recess first, and that said last mentioned needle will still bear its own stitch entirely and also both strands of the stitch belonging to the needle entering the same recess last. It is at this point in the operation that the surplus yarn, hereinbefore referred to is of great advantage and is utilized. As yarn furnished by the plugged sinker wheel is fed under the beards of every other needle only hereinbefore referred to as "intermediate" needles, and is laid outside of the beards of "predetermined" needles, from the latter of which the yarn is subsequently thrown off or dropped, there is produced a free surplus or slack of yarn, whereby when the held loops on the intermediate needles are carried around the adjacent needles, not provided with loops of the same strand or course, above described, said held loops may be lengthened or extended to take up this free surplus or slack without placing any undue strain upon the yarn, such as would tend to cause breakage thereof. The lengthening or extending of the held loops is accomplished by drawing into said held loops or stitches the loose yarn produced by the dropped loops adjacent to and respectively succeeding the held loops, through the loop in the preceding course of which it is held. Owing to this provision of the machine, comparatively light or weak yarn may be employed. The stitches are next engaged by the cloth wheel R, which forces all of them to the bottoms of the needles in the usual way, for the purpose of clearing the needles for engagement with the sinker wheel S. The sinker wheel S supplies yarn to all of the needles, under their beards in the usual manner. The beards of the needles

are next engaged by the cut presser wheel T, cut one and three, which is set to coact with the interchanging wheel M, so as to close the beards of three successive needles but not to close the beards of any of the needles which entered a recess 5, last and whose strands are borne over and around an adjacent needle as before described. While the beards of the needles are being closed by the cut presser T, as above stated, the landing wheel Y, engages the said needles and stitches thereon and raises all of those stitches to a point on the needles above the points of the beards, the yarn on the needles whose beards were not closed by the cut presser T, being under the beards and the other stitches being outside of the beards. The needles and stitches are next engaged by the cast-off wheel U, which raises the yarn on the needles whose beards were not closed by the cut presser T, to the top of such needles but under their beards, and raises all of the other stitches over and off from the tops of the needles.

While my machine is provided with a plugged sinker wheel, and a cut presser wheel cut and adjusted to coact with it, for the purpose, among other things of supplying surplus yarn to the stitches which are to be carried over and around the needles adjacent to needles holding such stitches, thus facilitating the operation of the other parts of my invention, and avoiding the straining or breaking of the yarn, it is possible to accomplish the interchanging of the needles as described and the carrying of stitches of needles over and around an adjacent needle without the use of the plugged sinker wheel and the cut presser cut and adjusted to coact with it.

While my invention as herein described, and as illustrated in the accompanying drawings, interchanges two adjacent needles in each succeeding group of four needles and carries a loop or stitch of one needle of such group of four over and around another adjacent needle of such group, it is apparent that by changing the teeth in the interchanging wheel so as to engage and confine two needles in a group of any number other than four, and by changing the plugged sinker wheel and the cut presser to correspond, in accordance with the principle described, it is possible to vary the mechanism so as to form many figures and patterns without departing from the principle of my invention.

What I claim is:—

1. In a circular knitting machine, means for producing loops, including devices for forming the same upon predetermined needles and dropping the same therefrom to constitute a free surplus or slack in the strand between the held loops, means for elongating and carrying certain of the held

loops around needles devoid of loops of the same course to take up said surplus or slack, and means for casting off said formed loops and intermeshing them with loops of a succeeding course.

2. In a circular knitting machine, the combination with suitable bearded needles, of means for forming loops on and carrying the strands under the beards of, predetermined bearded needles for the purpose of producing held loops on such needles and forming loops on and withholding said strands from passing under the beards of, other predetermined bearded needles and means for dropping the loops from the last mentioned needles for the purpose of constituting a free surplus in said strands between the held loops, means for subsequently absorbing said surplus by elongating the held loops, and means for casting off said held loops and intermeshing them with loops of a succeeding course.

3. In a circular knitting machine, the combination with suitable needles, of means for forming loops on and carrying the strands under the beards of predetermined needles for the purpose of producing held loops on such needles, and forming loops on, and withholding said strands from passing under the beards of, other predetermined needles and means for dropping the same from said last mentioned needles for the purpose of constituting a surplus in said strands between the held loops, means for carrying both threads of certain held loops around adjacent needles devoid of loops of that strand or course, and elongating the loops thus carried by absorbing said surplus, and means for casting off said held loops and intermeshing them with loops of a succeeding course.

4. In a knitting machine, the combination with the bearded needles, of means for laying yarn outside the beards of predetermined, and under the beards of intermediate, needles, means for closing only the beards of said intermediate needles, and means for moving the yarn to the extremities of the needles to drop or throw off the yarn from the predetermined needles to produce free surplus or slack.

5. In a knitting machine, the combination with the bearded needles, of means for laying the yarn outside the beards of predetermined, and under the beards of intermediate, needles, a cut presser for closing the beards of said intermediate needles, and means for moving the yarn to the extremities of the needles to drop or throw off the yarn from said predetermined needles to produce free surplus or slack.

6. In a knitting machine, the combination with the bearded needles, of a plugged sinker wheel for closing, and laying yarn outside of, the beards of predetermined

needles, and laying yarn under the beards of intermediate needles, a cut presser wheel for closing the beards of said intermediate needles, and means for moving the yarn to the extremities of the needles to drop or throw off the yarn from said predetermined needles to produce free surplus or slack.

7. In a knitting machine, means for producing loops, including devices for forming the same upon predetermined and intermediate needles, means for dropping the same from the predetermined needles to constitute a free surplus or slack in the strand between the held loops, and means for crossing loop-holding needles with adjacent needles, and cooperating means for depressing the yarn, to carry said held loops around said adjacent needles, to thereby elongate said held loops to take up said free surplus or slack.

8. In a knitting machine, means for producing loops, including devices for forming the same upon predetermined and intermediate needles, means for dropping the same from the predetermined needles to constitute a free surplus or slack in the strand between the held loops, and means for crossing loop-holding needles with adjacent needles, and cooperating means for depressing the yarn, to carry both threads of said held loops around said adjacent needles.

9. In a circular spring needle knitting machine, the combination with the needles, of a cloth wheel; a plugged stitch wheel in operative relation to the cloth wheel and acting coincident with it; a cut presser wheel following the plugged stitch wheel in operative relation to the cloth wheel, said cut presser wheel being cut and adjusted to coact and correspond with the plugged stitch wheel; a landing wheel in operative relation to the cut presser wheel and acting coincident with it; a cast-off wheel subsequent in operation to the cut presser wheel and landing wheel; an interchanging wheel provided with a series of openings along its periphery and acting on the needles subsequent to the action of the cast-off wheel, certain of the openings in the periphery of the interchanging wheel receiving needles free, and certain other openings receiving radially a plurality of needles at once and causing the tops of said last mentioned needles to interchange their positions relative to each other; and a small push-down wheel immediately following and above the interchanging wheel and acting coincident with it; all of said wheels being in operative relation to the needles.

10. In a circular spring needle knitting machine, the combination with the needles, of a cloth wheel, a plugged stitch wheel in operative relation with the cloth wheel and acting coincidentally therewith, a cut presser wheel following the plugged stitch wheel in

operative relation with the cloth wheel, said cut presser wheel being cut and adjusted to coact and correspond with the plugged stitch wheel, a landing wheel in operative relation with the cut presser wheel and acting coincidentally therewith, a cast-off wheel operating subsequent to the cut presser wheel and landing wheel, and interchanging means operating upon the needles and the stitches to cause the top of one needle to change its position with reference to the top of an adjacent needle, to carry both strands of a loop of one needle beyond the other needle.

11. In a circular spring needle knitting machine, a series of needles; a cloth wheel; a plugged stitch wheel; a presser wheel cut to correspond with the plugged stitch wheel, a landing wheel; a cast-off wheel, an interchanging wheel provided with means for causing one needle to interchange its position with an adjacent needle; a small push-down wheel to operate upon the stitches of the needles thus interchanged; means for holding down the stitches below the tops of the needles after the needles have been interchanged and have sprung back; a cloth wheel; a stitch wheel; a cut presser wheel so constructed that one or more needles shall be engaged and pressed off by the presser wheel before one is passed by it; a landing wheel and a cast-off wheel; the several wheels being in operative relation to the needles and arranged one relative to the other and operating in the order named upon any one part of the series of needles.

12. In a circular knitting machine, means for producing loops including devices for forming the same upon predetermined needles and dropping the same therefrom to provide a surplus in the strand between the held loops, means for elongating the held loops and absorbing the surplus in the strand, and means for casting off the formed loops and intermeshing them with loops of a succeeding strand.

13. In a circular knitting machine, means for producing loops, including bearded needles, means for carrying a strand beneath the beards of predetermined needles for the purpose of forming loops on such needles and withholding said strands from passing under the beards of other needles, said last mentioned means including a plugged sinker wheel, means for dropping the loops thus formed from said last mentioned needles for the purpose of constituting a surplus in the strand between the held loops, means for elongating the loops by taking up the surplus, and means for casting off the formed loops and intermeshing them with loops of a succeeding strand.

14. In a circular knitting machine, means for forming loops, said means including bearded needles, means for carrying strands

under the beards of predetermined needles
to form loops on such needles, means for
preventing said strands from passing under
the beards of other predetermined needles
5 and dropping them from the last mentioned
needles for the purpose of constituting a sur-
plus in the strands between the held loops,
means for subsequently taking up the sur-
plus by elongating the held loops, and means

for casting off said held loops and intermesh- 10
ing them with loops of a succeeding course.

In testimony whereof I have affixed my
signature in presence of two witnesses.

JAMES McNAMEE

Witnesses:

B. M. SHEA,

WM. J. D. LAMATER.