

K. H. WHITE.
KNITTING MACHINE.

APPLICATION FILED APR. 14, 1906.

2 SHEETS—SHEET 1.

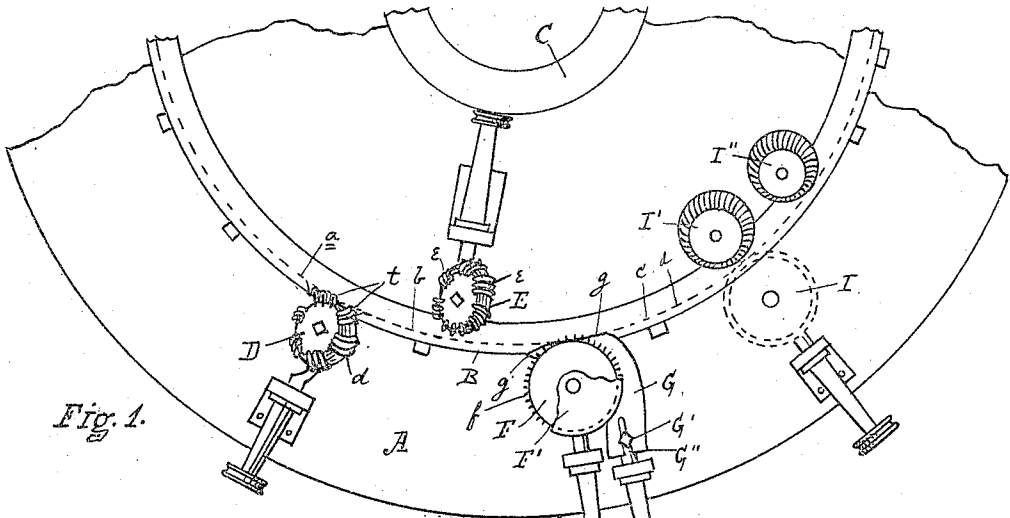


Fig. 1.

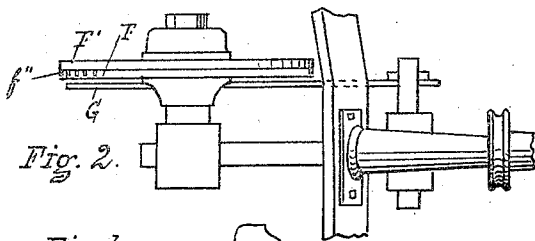


Fig. 2.

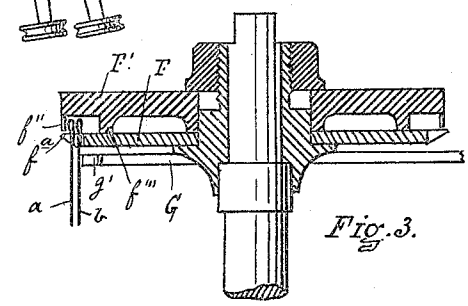


Fig. 3.

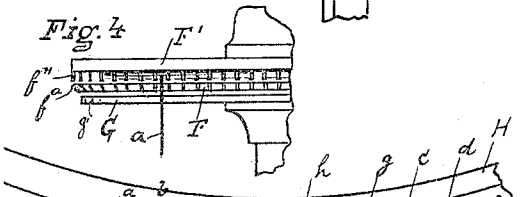


Fig. 4.

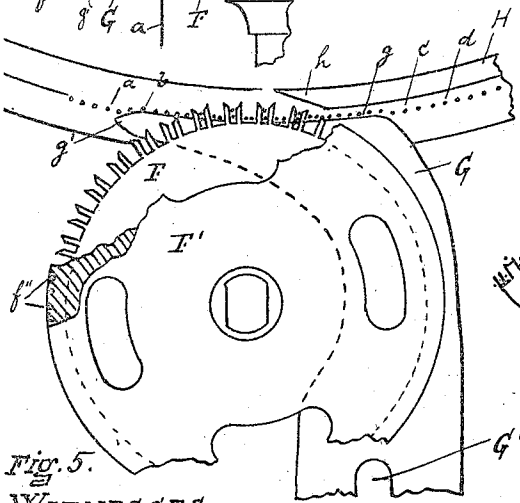


Fig. 5.

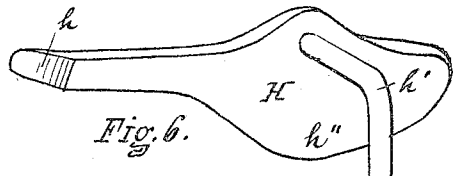


Fig. 6.

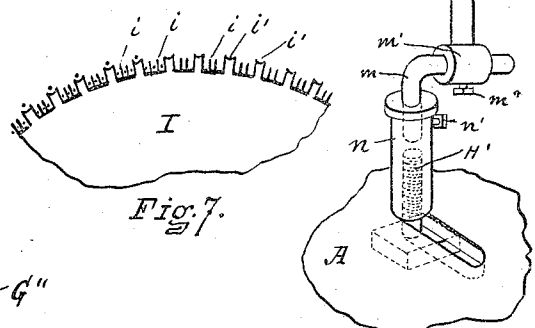


Fig. 7.

WITNESSES
 Rich. A. George
 E. P. De Giorgi.

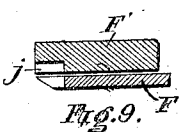


Fig. 9.

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No. 893,407.

PATENTED JULY 14, 1908.

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2 SHEETS—SHEET 2.

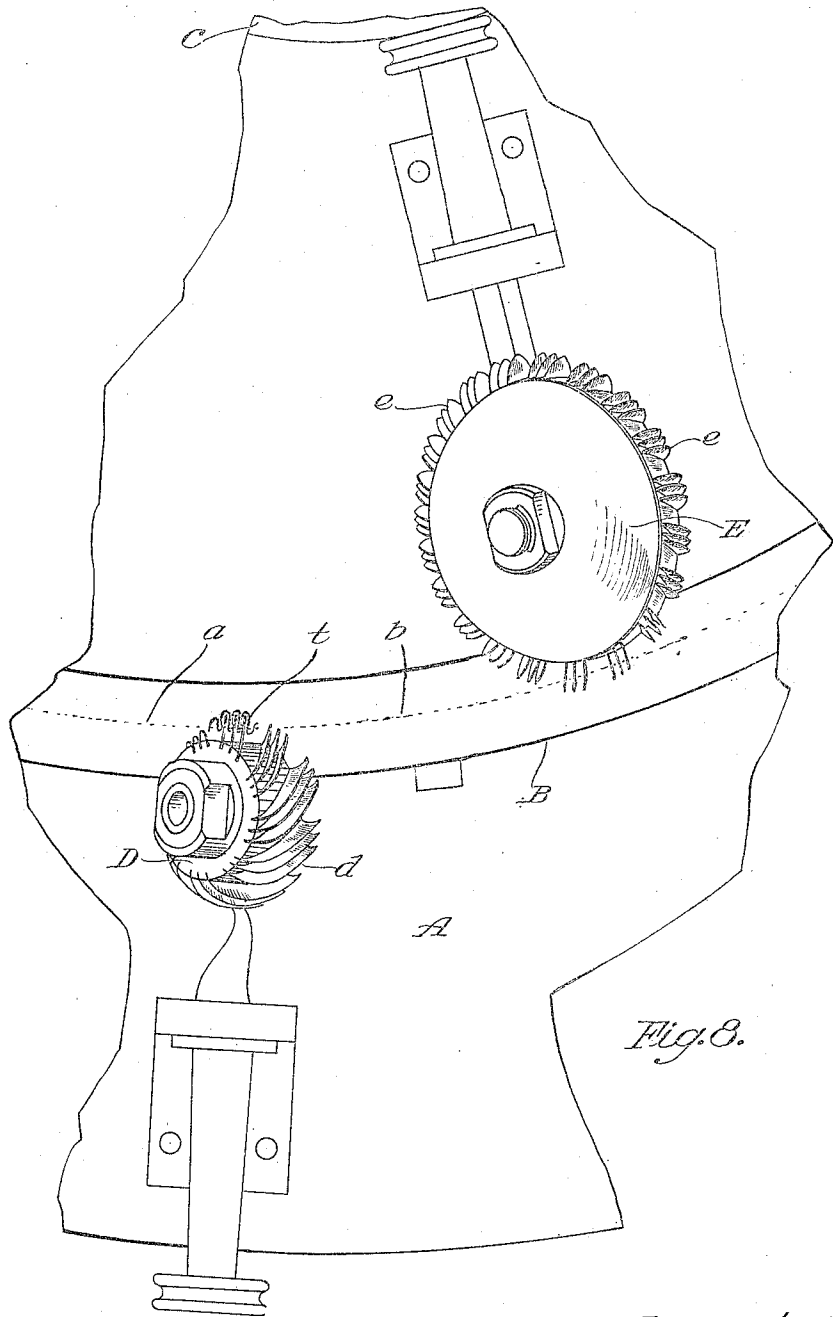


Fig. 8.

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E. C. De Giorgi.

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UNITED STATES PATENT OFFICE.

KIRK H. WHITE, OF OSWEGO, NEW YORK, ASSIGNOR OF ONE-THIRD TO DAVID M. FARRELL AND ONE-THIRD TO ALBERT L. SHEPARDSON, OF OSWEGO, NEW YORK.

KNITTING-MACHINE.

No. 893,407.

Specification of Letters Patent.

Patented July 14, 1908.

Application filed April 14, 1906. Serial No. 311,648.

To all whom it may concern:

Be it known that I, KIRK H. WHITE, a citizen of the United States, residing at Oswego, in the county of Oswego and State of New York, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to an improved knitting machine, and I declare that the following is a full, clear, concise and exact description thereof sufficient to enable one skilled in the art to make and use the same, reference being had to the accompanying drawings in which like letters and numerals refer to like parts throughout.

The invention is applicable to that class of knitting machines known as spring-needle machines and is shown in connection with a well-known machine of that class and I, therefore, do not describe or illustrate the general and usual features of such a machine as they will be readily understood.

The particular functions of the devices shown relate to the transfer of a stitch from one needle to another, or other like operation, whereby is produced a fabric of open mesh, the variety of which fabrics depends on the particular construction of the several parts of the device which are employed on the machine, while still within the terms of the invention which is illustrated in but a single form.

In the drawings Figure 1 is a plan view indicating in a general way the cylinder and some of the parts of an ordinary spring-needle machine, together with the several parts of my invention. Fig. 2 is a side view of certain parts of the invention. Fig. 3 is an enlarged detail of Fig. 2. Fig. 4 is a partial front view of the same. Fig. 5 is a partial top view of some of the parts shown in Fig. 3 and a combined presser and cloth shoe. Fig. 6 is a perspective view of the combined presser and cloth shoe and its mounting. Fig. 7 is a partial view of a presser wheel, and Fig. 8 is an enlarged view of dividing and landing wheels and Fig. 9 shows a modified construction of the stitch controller.

It will be understood that the several devices may be mounted, when suitable, on the well-known presser-stand whereby their adjustment and tension is regulated. The de-

tails of such construction are, therefore, not shown. They may, otherwise, be mounted by any well-known means to secure the end sought.

Referring to the drawings, A shows part of the base-plate, B represents the cylinder with needles *a, b, c, d*, represented in Fig. 1 by curved lines thus lettered showing the line of their position, and C the inner circle of the machine, and on which plate and circle, it will be understood, are mounted, the ordinary members which cooperate in the work of the machine and are well known in the art.

In the revolution of the cylinder (which is supposed to be in a left hand turn, the part shown in Fig. 1 passing to the right) the needles, when they come to one feed, have on their shanks the stitches supplied at the former feed and its cooperating parts. The feeds and connected parts are not shown as they are well-known in the art and their form and position will be understood. At the second of the two feeds which are mentioned the needles receive additional loops and it is assumed that certain of the loops there received are to be transferred from one needle to another, to cause the peculiarity of fabric. It is very important that these loops shall be of sufficient length to permit this without undue strain or breaking of thread or needle and without causing an irregular or uneven appearance in the cloth. For this purpose I provide a dividing or sinker wheel D, similar to the ordinary wheel but having straight blades *d*, arranged in series so as to press the yarn or thread, *t*, in three successive long loops between four successive needles, as shown in Fig. 1, leaving two needles with long loops thereon. The blades of this dividing wheel can, of course, be differently grouped according to the product desired.

Ordinarily the loops already on the needle shank will be brought up into the needle hooks by the ordinary means, but, as the loops just made are longer than usual, I provide a landing or loop-positioning wheel E to meet such unusual conditions, having blades *e* grouped like those in the sinker or dividing wheel and made large enough to raise the old stitches the proper distance on the new and longer ones the blades of this wheel being large enough to raise or land the long stitches, it is found that they also raise or land the

short stitches between the groups of long ones and that no blade is necessary between the said groups of large blades. The terms applied to wheel E are those of convenience, since it is not strictly a landing wheel, but lifts the irregularly divided yarn a distance which is necessary in this peculiar construction. As indicated, these wheels are to be mounted on the fixed structure by the familiar presser stand or other suitable means. The revolution of the cylinder then brings the needles to the devices provided for transferring the stitch or loop, the stitches being arranged, in this particular construction, as two long and two short, alternating pairs. These devices comprise a transfer wheel, F, a stitch controller F' and an alining presser or needle controller G cooperating therewith.

The transfer wheel F is mounted on a standard, as other parts are, and turns freely by engagement of the needles therewith. In the form here illustrated it comprises a toothed disk, F. The disk F has the teeth f spaced to receive two needles between them in the natural work of the machine and each slotted at f' to receive two needles the first of which is forced to the left, the second being forced somewhat to the right, making the first standing directly back of the second needle entering the slot. This construction is to be modified according to the work to be done. The edges of the slot diverge at the end as clearly shown, one to allow free access of the first of the two needles to reach the slot, and the other to force the second needle behind the first, in the slot. The tips of the teeth are suitably and slightly beveled as at fa to allow easy passage of the cloth or stitches down on the needles. The stitch controller F' is a disk of slightly less diameter than the disk F. It might be made integral though I show it as a separate piece. On its periphery it has downwardly projecting pins f'' which register exactly with the tips of the teeth and adjacent the upper face of each, but in this instance do not quite touch the surface of the teeth because of the annular shoulder or rim f''' to limit the contact of the pins with the teeth when the parts are assembled, the purpose being to provide guards to confine the stitches within the space occupied by the needles.

The loop which is on the needle first to enter the slot is to be slipped over the head of the second needle. This is done by pressing down the cloth or web after it has been allowed by the natural pull or strain to rise far enough for clearance. But it has been found that the loop sometimes slips to one side of the outer needle. To prevent that I provide the pins f'' which confine the loop at each side to the space occupied by the needles. While I have shown a construction having these pins it is obvious that other mechanical forms in effect providing a chamber for the

loop, might be given to the device to accomplish the same result of controlling the stitches and still be within the scope of the invention. For instance, the cap-plate might be chambered to present tooth edges like the pins: to provide means to confine the loop laterally as in Fig. 9 where j is one side of such a chamber, the disk F' forming the top and back walls.

G is the curved needle aliner or controller mounted as the other members, with adjusting means G' in slot G''. It is a plate extended between the mounting of the transfer wheel and the needles and slightly below the wheel. Its pressing edge g has the same curve as the travel of the needles and is substantially on a line with the bottom of the slots of the transfer wheel. Its tip g' is slightly pointed out so that when the needles reach the presser they are engaged by the curved edge and held in or supported on a line of travel the same as the curve the cylinder needles normally travel in. They are thus perfectly adjusted or alined with reference to the wheel and to the cylinder. This presser may be so adjusted that the needles are all pressed slightly within their normal line of travel (as seen in Fig. 5) so that the natural outward spring will quicken their movement into the slots of the transfer wheel. The pressing edge, g , of the controller extends in the same curve beyond the point where, by the revolution of the transfer wheel, its teeth are carried away from the curved edge of the controller, and beyond the point of transfer. It is found that the needles in the slot or between the teeth are apt to be carried by the transfer wheel away from the cylinder line and be broken or bent. The controller or presser, however, prevents this, the edge, g , extending tangent to the periphery of the transfer wheel, or eccentric to the center of the transfer mechanism.

It will be understood that the two needles which have the long stitches or loops are the ones that enter the slot and that the wheel is to be formed and adapted to receive them in the slot and between the portions of the teeth. The other needles pass in the space between the slotted teeth—such number as the pattern requires.

After the teeth have been forced into the slot and the cloth loosened to permit the loop to cover the head of the other needle or needles it is necessary that it be pressed down over the heads of the needles and that the cloth or web should be further pressed down in readiness for the next stitch. It has been customary to provide a presser near the transfer wheel and a cloth wheel farther on. I have devised a single shoe H to meet both these needs. Its tip or forward end h is slightly tapered upward and inward from the bottom to make an easy engagement of the fabric. It is held by a

bent standard h' suitably on the base, by bolt H' , hand-screw n , set-screw n' , shank m , head m' and set-screw m'' , to permit adjustment, the tip being so located as to press the loops down just as the needles come from the transfer wheel. From the tip the lower edge extends rearwardly and downwardly in the curve h'' which is formed and located to hold the fabric down. Beyond this and before the next feed is the notched presser wheel I which in this instance is formed with teeth to pass three needles therebetween at i , the teeth i' being provided to press in or close the barb of the fourth (the one whose stitch was slipped over the next needle) so that the stitch is cast off that needle and a space or opening made in the fabric by the absence of that stitch. This presser wheel is to be mounted as other parts of the device and is cut to correspond with the dividing and cast-off wheels and the transfer wheel, it being understood that the several parts described cooperate to produce the desired pattern of fabric.

Near presser wheel I, which in the form here shown may be called a 3 and 1 cut presser, are mounted landing wheel I' and cast-off wheel I'' of usual form and position, both well-known in the art.

It will be understood that the style of the fabric may be varied according to the number of needles on which long loops are to be placed and which are to be grouped in the transfer wheel and from one or more of which loops are subsequently to be cast off: also depending on the number of needles between the set or series on which long loops are placed. Thus the several parts described may be constructed to conform to a given scheme, the several members cooperating in producing a fabric of the desired pattern.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a circular knitting machine, the combination with a transfer mechanism, of a sinker wheel and a landing wheel, the former having blades arranged in sets of a given number with space between each set, and the latter having blades arranged in sets of an equal number with a like space between the sets of blades thereof, substantially as described.

2. In a knitting machine, the combination with a transfer mechanism, of bur wheels having blades arranged in corresponding groups with equal spaces between the groups, one of said wheels being constructed and positioned to supply thread to the needles for long loops for such transfer and the other to position the yarn off such long loops in knitting; substantially as described.

3. In a knitting machine, the combination with a transfer mechanism, of a sinker wheel and of a landing wheel, each having blades

arranged in corresponding series, the former placing between certain of the needles a greater length thread than between the others and the two cooperating to present the fabric to the transfer mechanism with certain loops elongated.

4. In a knitting machine, the combination with a transfer mechanism comprising a member to receive in juxtaposition the needles engaged in the transfer, of a stitch controller having members bounding the space occupied by the stitches engaged in the transfer.

5. In a knitting machine, the combination with a transfer mechanism, of a stitch controller having means inclosing the stitches carried by the needles engaged in such transfer within the field of such transfer.

6. In a knitting machine provided with mechanisms for transferring a stitch, a transfer wheel having teeth disposed to position the needles for such transfer and having vertical guards on the sides of the space occupied by the needles in such transfer to retain the stitch in place for such transfer, substantially as shown.

7. In a knitting machine having a stitch transfer mechanism, a stitch controller having a guard on each side of the needles to and from which the transfer is to be made confining the stitches within the space provided for the needles.

8. In a knitting machine, the combination with a transfer mechanism, of a needle controller having an extended curved edge bearing against the outer edges of the needles and adjustably mounted to limit the outward movement of the same, substantially as shown.

9. In a knitting machine, the combination with a transfer mechanism, of a needle controller having an extended curved edge bearing against the outer edges of the needles and confining them within their normal line of travel from a point before to a point after the point of the transfer, substantially as shown.

10. In a knitting machine, the combination with a transfer mechanism, of a needle controller having an extended curved edge bearing against the outer edges of the needles and adjustably mounted to spring the needles inwardly beyond their line of travel in the cylinder in preparation for the transfer operation, substantially as shown.

11. In a knitting machine, the combination with a transfer mechanism including a wheel for positioning the needles, of a needle aliner having a curved edge extending a distance beyond the point of transfer and in a curve eccentric to the center of said wheel, substantially as shown.

12. In a knitting machine, the combination with a transfer mechanism, of a needle aliner formed at one end to engage the needles against its edge and having such edge

extending therefrom in a curve similar to that of the cylinder past the point of transfer, substantially as shown.

13. In a circular knitting machine having a transfer wheel indented to receive certain of the needles side by side and certain of them edge to edge, an adjustably mounted needle controller having a curved edge to receive and press inward the needles successively whereby to insure their engagement in the indents of the transfer wheel and to force their dis-engagement therefrom.
14. In a circular knitting machine having means to transfer a stitch from one or more needles to one or more other needles, a needle controller having a needle-bearing edge extending in substantially the curve of the cylinder from a point before to a point beyond the transfer mechanism.
15. In a knitting machine, the combination with a mechanism for transferring a stitch from one or more needles to others, of an adjustably mounted needle aliner positioned to aline the needles slightly within their normal line of travel, and a transfer wheel slotted to receive the needles cooperating in the transfer and having the base of the slots on a circle substantially coincident with the edge of the needle aliner at the point of transfer.
16. In a circular knitting machine, the combination of a dividing wheel and of a landing wheel, each having blades arranged in series of like numbers to provide loops of particular length and for casting over said loops, means disposing the needles bearing said loops in juxtaposition and for casting the loop of one needle over the other needle, a needle alining member mounted and adjusted to position the needles relative to said transfer, and a presser shoe having a curved tip adjacent the point of such transfer and having its lower edge extending therefrom forwardly and downwardly to press the fabric down, the said presser and cloth shoe

being mounted on the base to permit adjustment thereof relative to the cylinder and to the transferring means, substantially as described.

17. In a knitting machine, the combination with a transfer mechanism, of means inclosing the stitch within the field occupied by the needles in the transfer and a presser shoe, substantially as described.

18. In a knitting machine, the combination in a transfer mechanism, of members providing side bounds for the stitches engaged in the transfer and a needle controller extending before and behind the transfer mechanism, substantially as described.

19. In a knitting machine, the combination with a transfer mechanism, of wheels constructed to supply to said mechanism loops of a particular length, and a stitch controller confining the said loops to the space occupied by the needles engaging such transfer, substantially as described.

20. In a knitting machine, the combination in a transfer mechanism, of a toothed wheel, a stitch inclosure comprising members at the sides of the needles and a needle controller engaging the needles before the point of the transfer and discharging them thereafter, substantially as described.

21. In a knitting machine, the combination in a transfer mechanism, of a toothed wheel, a stitch inclosure comprising members at the sides of the needles and a needle controller engaging the needles before the point of the transfer and discharging them thereafter, and a presser-shoe engaging the loops at about the point of transfer and pressing the fabric downward after such transfer below the level of the transfer mechanism, substantially as described.

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

KIRK H. WHITE.

Witnesses:

HARRY C. MIZEN,
JOHN TIERNAN.