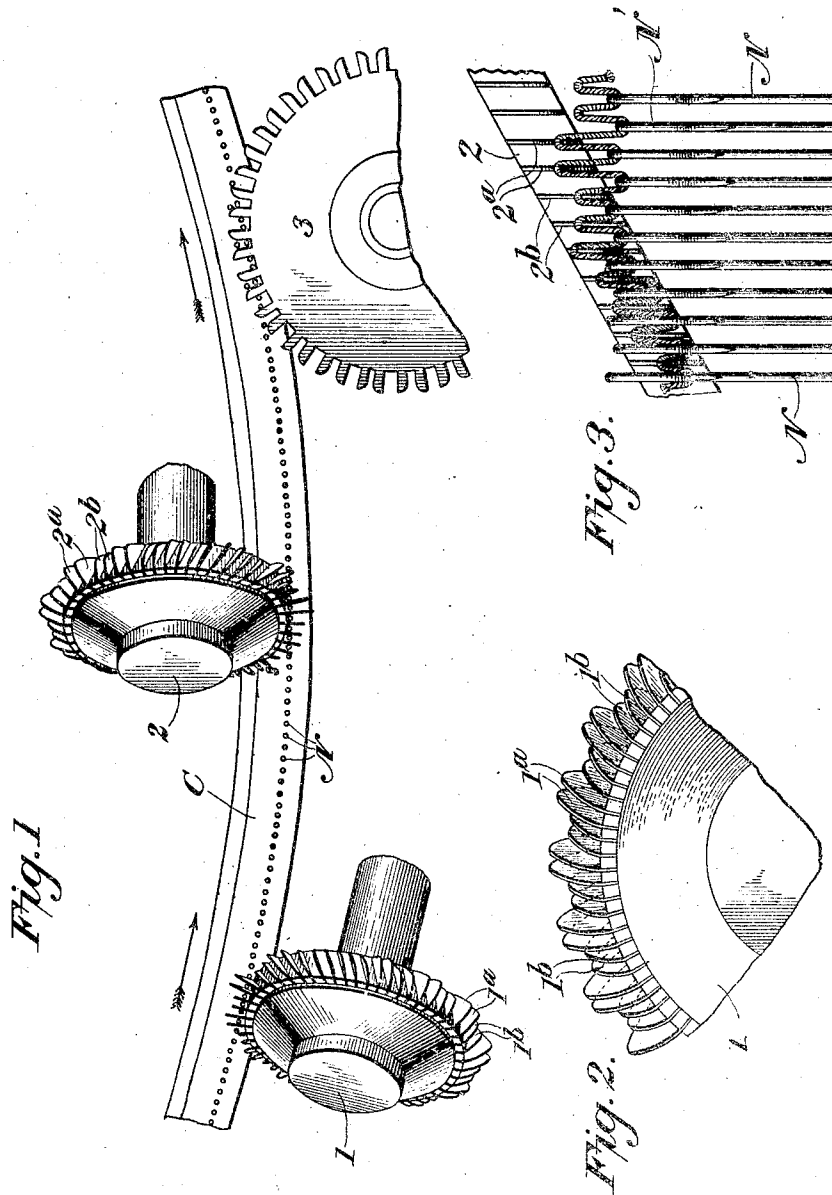


C. J. MUMFORD.
KNITTING MACHINE.
APPLICATION FILED MAY 1, 1909.

944,968.

Patented Dec. 28, 1909.



Witnesses

M. E. Fowler
L. E. Witham.

Inventor

Carlton J. Mumford

By

Alexander T. Dowell
Attorneys

UNITED STATES PATENT OFFICE.

CARLTON J. MUMFORD, OF AMSTERDAM, NEW YORK.

KNITTING-MACHINE.

944,968.

Specification of Letters Patent.

Patented Dec. 28, 1909.

Application filed May 1, 1902. Serial No. 492,346.

To all whom it may concern:

Be it known that I, CARLTON J. MUMFORD, of Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Knitting-Machines; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in stitch transfer mechanisms for circular spring-beard-needle knitting machines; and the object of the invention is to enable such machines to be operated to produce an open mesh or open work fabric by providing means whereby long and short loops may be produced and transferred to neighboring needles in any desired regular sequence, said means comprising novel burs, which I herein call the divider wheel and divider cast-off wheel, said wheels being provided with blades after the manner of ordinary burs; but certain of the blades are made shorter than the others in predetermined order; such long blades being adapted to form stitches or loops longer than those produced by the other blades.

A further object of the invention is to improve the arrangement of the spring beard needles so as to facilitate the transfer of the loops and prevent dropped stitches in the completed fabric.

The general structure of the machine to which the invention is applied is well understood and therefore it is unnecessary to illustrate same in the drawings; but I have indicated so much of the machine in the drawings as is necessary to enable one familiar with the art to readily comprehend and use the invention and apply it to knitting machines of the general type referred to.

In the drawings—Figure 1 represents an enlarged plan view of part of a circular spring-needle knitting machine showing my improved burs in operative position. Fig. 2 is an enlarged view of a segment of the divider wheel. Fig. 3 is an enlarged diagrammatical side elevation of some of the needles and the divider cast-off wheel showing the mode of operation of the latter.

In said drawings C designates a spring beard needle cylinder which is adapted to rotate in the direction indicated by the arrows, so as to carry the needles successively

past the looping, transferring and cast-off devices, as usual. The needles N may be attached to the cylinder in any desired way; the invention being applicable to knitting machines using either a leaded-needle cylinder, or a trick needle cylinder.

1 designates what I term the "divider wheel", or bur, which operates at the outer side of the needles and may be supported on the usual bur stand or in any other suitable manner, not shown; and 2 designates what I term the "divider cast-off wheel", or bur, which operates at the inner side of the needles and may be supported on an ordinary grip or in other suitable manner, not shown. Such devices being well known. These wheels 1 and 2 are located adjacent the cylinder at a point intermediate the usual devices for looping the yarn on the needles (not shown); and the usual landing and cast-off devices, (not shown). These looping and landing cast-off devices may be of any desired kind and are well known with those familiar with this class of machine.

The divider-wheel 1 is constructed much like an ordinary bur but is provided with alternate sets of long blades 1^a and similar but shorter blades 1^b; the relative number and distance apart of the sets of short and long blades depends upon the pattern to be produced,—i. e. the number of long loops to be produced in sequence and the number of intermediate short loops to be produced in sequence between the sets of long loops. In the example shown in the drawings the pattern requires two long loops and two short loops in each set, hence there are two long blades 1^a in each set, and two short blades 1^b in each set. It should be remembered that the loop-wheel or looping devices, (not shown) loop the yarn in the needles and leave such loops practically uniform before they reach the divider-wheel. The long blades 1^a of the divider 1 however draw certain of the loops in the needles longer than the others, stealing the yarn from the loops on adjacent needles in so doing. Three elements are required in drawing one loop; that is, a needle and two blades, one on either side of the needle, consequently the "divider" really divides the previously formed loops, as desired, because these long blades 1^a in drawing out long loops steal the yarn from the adjacent loops, but the two short blades 1^b prevent the stealing of too

much yarn from the latter loops and cause the short loops to be uniform in length. The divider-wheel is positively and uniformly driven as it has a blade in mesh with every needle space, so that there is less danger of the wheel blades over-reaching and breaking needles.

Beyond the divider-wheel 1 is a divider cast-off wheel 2, which is substantially like a regular cast-off bur except that it has alternate sets of long and short blades 2^a and 2^b corresponding in arrangement to the blades of the divider-wheel. Thus in the example illustrated the divider cast-off wheel has two long blades 2^a in each set, and two short blades 2^b in each set. This divider cast-off wheel casts the loops off of the heads of the needles and acts much like an ordinary cast-off bur, except that it preserves the long and short loops formed by the divider-wheel 1, that is, the long blades 2^a draw and hold the long loops to the proper size in casting them off and the shorter blades 2^b draw and hold the small loops to the proper size as is required. In the casting off of each loop three elements are required; that is, the needle and two adjacent blades, and my divider cast-off wheel keeps the long loops uniform in length, as well as the short loops, thus making the resultant fabric uniform in appearance. This divider cast-off wheel also has the advantage of a regular positive drive since it has a blade meshing with every needle space.

Beyond the divider cast-off is a transfer presser indicated at 3, which may be of any type that holds the heads of two adjoining needles together for the purpose of transferring the stitch from one to the other and requires no special explanation or illustration.

Another important feature of the invention is the peculiar arrangement of the needles N. By reference to the enlarged diagrammatical Fig. 3, it will be seen that the needles N are slightly longer than the needles N' with which they alternate. The difference in length is of great importance. The long needles N are the ones from which the loops are transferred, and the greater length of needles N makes it possible to get the loop directly over the head of the adjoining shorter needles N', so that when a short needle N' is pressed behind a long needle N by the transfer presser (preparatory to transferring the loop from the long needle to the short needle)—the short needle does not interfere with the loop on the long needle and when the loop on the long needle N is pressed downward it will surely encompass the adjacent shorter needle N'. With the ordinary arrangement of needles of equal length it frequently happens that the loop to be transferred catches against the side of the adjoining needle thus preventing the

transfer and ultimately causing a drop stitch. But by using alternate long and short needles I practically obviate such defects. The long needles N are the ones from which the loops are transferred and the short needles N' are the ones to which the loops are transferred; this feature is entirely independent of the method of holding the needles.

The arrangement of long and short spring beard needles will not affect the correct action of the divider cast-off and is of material advantage in the transferring of the loops as described above. Fig. 3 illustrates the action of the alternate long and short needles and the alternate sets of long and short cast-off blades 2. The blades rise successively into casting-off position, and certain loops are drawn longer than the others; but all the long loops are drawn to uniform length; and all the short loops are drawn to uniform length.

The essential function and object of the invention is to draw the long loops uniformly and hold them so, and to simultaneously keep the other short loops or thread intermediate the long loops under control. With all the blades being in condition for active operation with the needles, the mesh or operative relation between the burs and needles is constantly and uniformly maintained, and there is no danger of the burs and needles getting out of relation time or mesh as would be the case if the short blades were omitted; whereas in my invention the burs are always in positive mesh with the needles and driven thereby. Obviously the order of long and short loops produced can be determined by the number and arrangement of long and short blades, and sets thereof, in the wheels 1 and 2.

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

1. In a knitting machine for making transferred stitch fabrics, the combination of spring beard needles, and a divider-wheel having similarly shaped blades arranged in alternate sets of long blades and short blades, for the purpose of drawing long and short loops in regular sequence, substantially as specified.

2. In a knitting machine for making transferred stitch fabrics, the combination of spring beard needles, and a divider cast-off wheel having similarly shaped blades arranged in alternate groups of long blades and short blades, for the purpose of holding and casting off long and short loops in regular sequence, substantially as specified.

3. In a knitting machine for making transferred stitch fabrics, a needle cylinder, and spring beard needles, the needles from which the loops are to be transferred being slightly longer than the needles to which

the loops are to be transferred, and means for transferring loops from the long to the short needles.

4. In a knitting machine for making transferred stitch fabrics, a needle cylinder having long and short spring beard needles arranged in alternation; in combination with a cast-off bur, and means for transferring loops from the long to the short needles.
5. In a spring beard needle knitting machine for making transferred stitch fabrics, the combination of a needle cylinder having alternate long and short needles, with a di-

vider-wheel and a cast-off wheel, said wheels being respectively adapted to form alternate long and short loops, and to cast off such loops; and means for transferring the loops from the long to the short needles. 15

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses. 20

CARLTON J. MUMFORD.

Witnesses:

CHAS. E. HARDIES,
BENJ. H. WEISBERG.