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2 SHEETS—SHEET 1.



COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

F. E. WILSON & F. W. KNAPP.
 STITCH TRANSFERRING MECHANISM FOR CIRCULAR KNITTING MACHINES.
 APPLICATION FILED SEPT. 29, 1910.

999,287.

Patented Aug. 1, 1911.

2 SHEETS-SHEET 2.

Fig. 2.

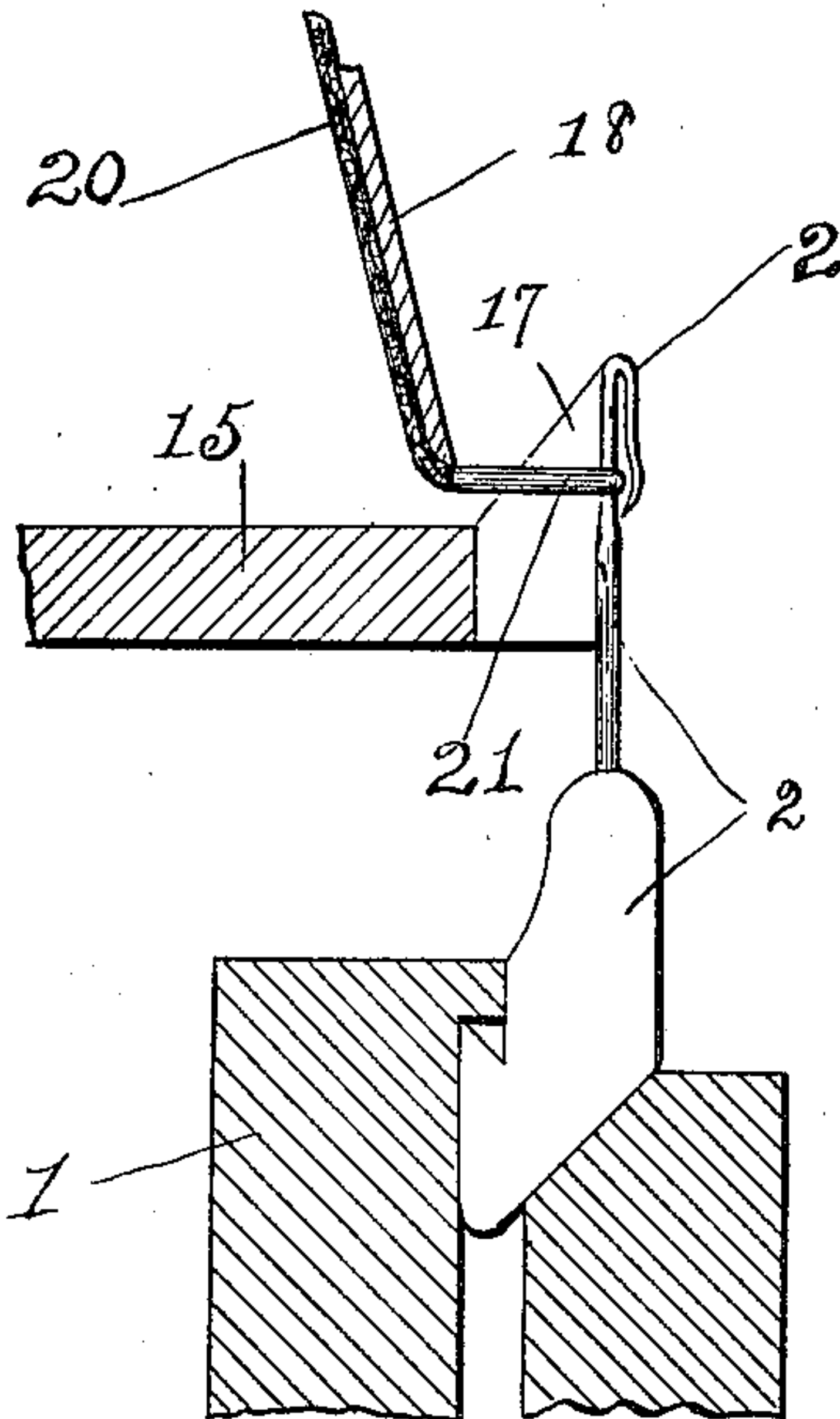
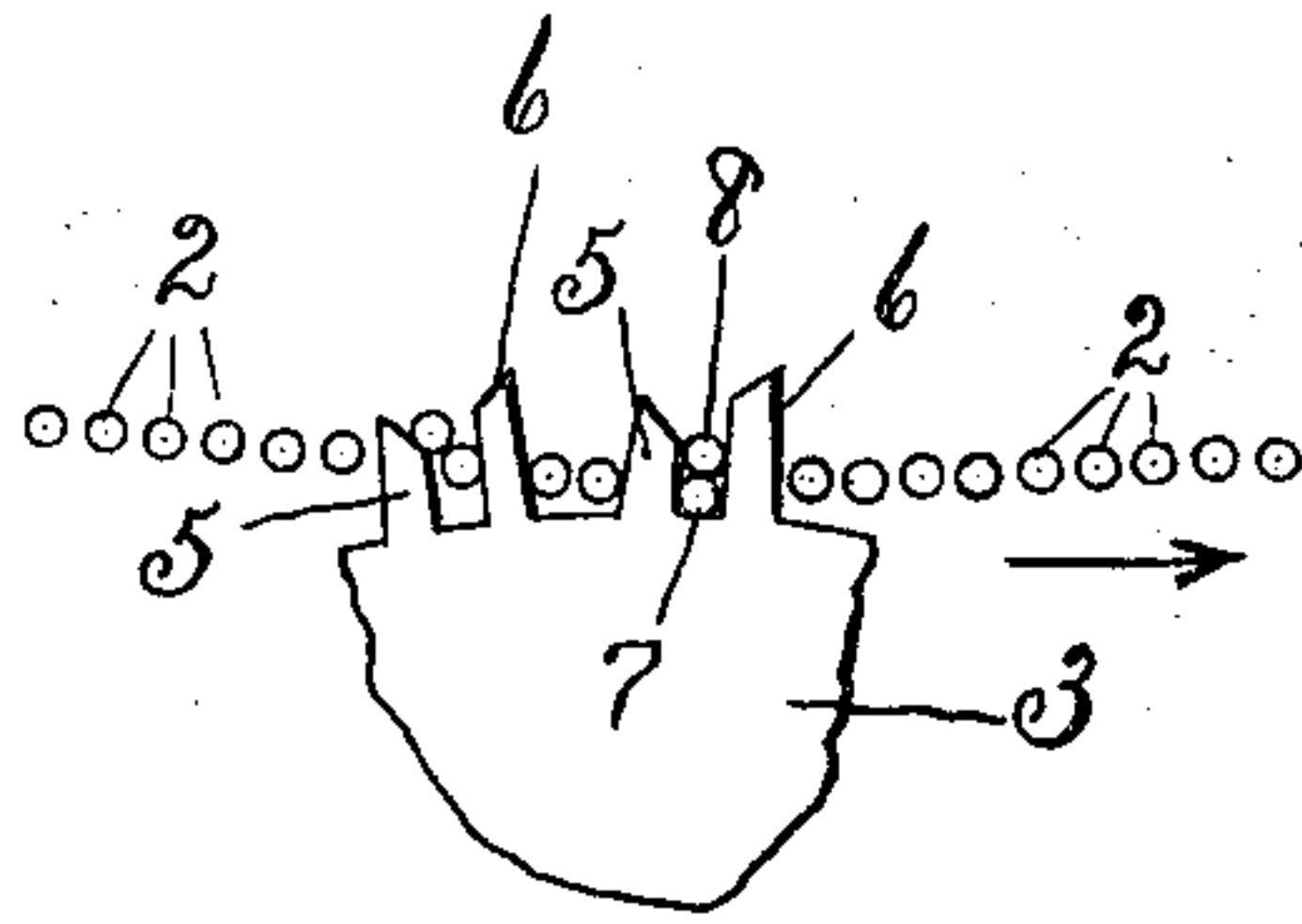


Fig. 3.

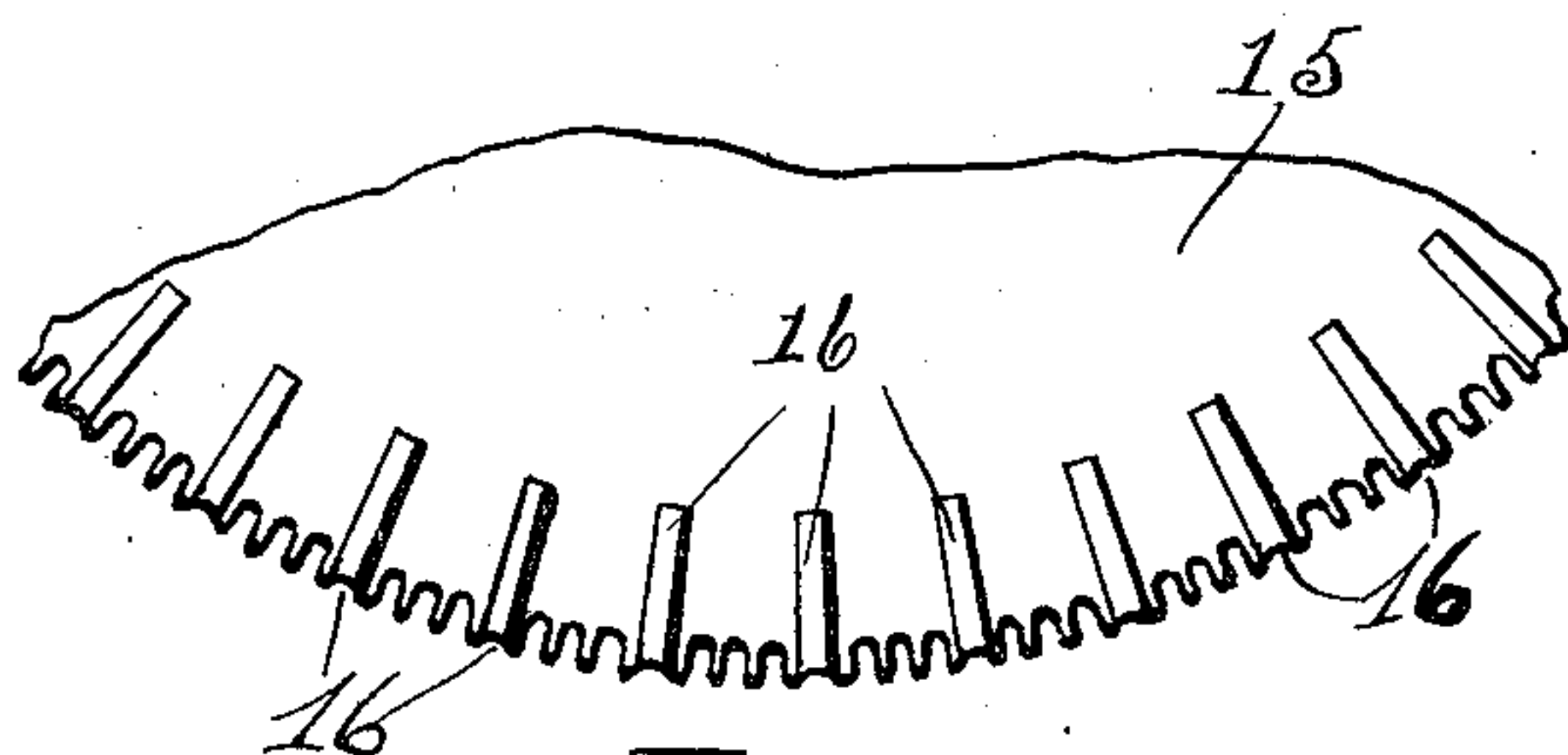


Fig. 4.

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FRANK E. WILSON AND FREDERICK W. KNAPP, OF AMSTERDAM, NEW YORK.

STITCH-TRANSFERRING MECHANISM FOR CIRCULAR-KNITTING MACHINES.

999,287.

Specification of Letters Patent.

Patented Aug. 1, 1911.

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To all whom it may concern:

Be it known that we, FRANK E. WILSON and FREDERICK W. KNAPP, each a citizen of the United States, residing at Amsterdam, county of Montgomery, and State of New York, have invented certain new and useful Improvements in Stitch-Transferring Mechanism for Circular-Knitting Machines, of which the following is a specification.

10 The invention relates to such improvements and consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification. Similar characters refer to similar parts in the several figures therein.

20 Figure 1 of the drawings is a top plan view showing our improved attachments applied to a circular knitting-machine. Fig. 2 is a plan view showing a number of the needles and a fragment of the alining-wheel in position to aline a needle from which
25 with a needle to which a stitch is to be transferred. Fig. 3 is a cross-sectional view of the distending-wheel and neighboring parts illustrating the manner in which a stitch is distended preparatory to being transferred.
30 Fig. 4 is a top plan view of a fragment of the distending-wheel. Figs. 2, 3 and 4 are drawn on an enlarged scale.

This invention relates more particularly to attachments for spring-needle circular
35 knitting-machines whereby the machine is adapted for the making of openwork knitted fabric, the openings in the fabric being formed by transferring during the knitting operation certain stitches, each from the
40 needle upon which it was originally formed to another needle adjacent thereto. In thus transferring stitches from one needle to another, particularly with a comparatively closely or firmly knitted fabric, the tension
45 or pull of the loop or stitch to be transferred upon the needle whereon it was originally formed tends more or less to resist the displacement of the needle necessary to cause said loop to overhang the needle to which it
50 is to be transferred.

An important feature of our invention is an attachment whereby the stitch to be transferred is automatically stretched or drawn out in advance of the transferring

operation in order to relieve such pull or 55 tension and thereby to facilitate the transfer of the stitch.

Other features and objects of the invention will appear in connection with the following description. 60

Referring to the drawings wherein the invention is shown in preferred form, 1, represents the needle-cylinder upon which are mounted the needles 2.

An alining-wheel, 3, is rotatively mounted 65 in position to engage the outer side of the needles 2. The periphery of the alining-wheel is notched to receive the needles by engagement with which the alining-wheel is rotated; and the projections or teeth thus 70 formed upon the periphery of the alining-wheel are so formed that in the brief interval during which the several teeth are in engagement with the respective needles during the rotative movement, two adjacent needles 75 will be forced into the same narrow peripheral notch or slot and into substantially the same line radial to the cylinder. The order in which the notches are located in the periphery of the alining-wheel will vary for 80 different patterns of fabric.

The wheel shown in the drawings is adapted for transferring every fourth stitch from the needle upon which it was originally formed to the needle next in rear thereof, and said wheel is provided at intervals on its periphery, corresponding with the location of each fourth needle on the cylinder, with the narrow notch or slot, 4, formed between two teeth, 5 and 6, and adapted to 90 receive the needle, 7, to which, and the needle, 8, from which, the stitch is to be transferred. The tooth, 6, on the front side of said slot, 4, projects outward somewhat farther than the tooth, 5, at the rear of said 95 slot, and the ends of both said teeth, 5 and 6, are beveled or inclined inward toward the slot. The points thus formed on the teeth, 5 and 6, are so located that as the alining-wheel is rotated by the meshing of its teeth 100 with the needles, the point of the tooth, 6, will enter between the needle from which the stitch is to be transferred and the next needle in advance thereof, while the point of the tooth, 5, will enter between the needle 105 to which the stitch is to be transferred and the next needle in rear thereof. As the points of the respective teeth are forced

more deeply in between the needles, the needle from which and the needle to which the stitch is to be transferred will by the beveled surfaces on said teeth be thrown toward the slot which they will enter one after the other, the one engaging the longer tooth being the first to enter, whereby it is caused to assume a position in the slot outside of the needle to which the stitch is to be transferred, and in the same line therewith radial to the cylinder, as shown in Fig. 2. By this operation, as will be readily understood by those skilled in the art, the loop or stitch on the outer needle, 7, will be brought above and in line with the needle, 8, to which it is to be transferred.

In order to cause said loop to embrace the needle, 8, to which it is to be transferred, we mount opposite the alining-wheel a small cloth-depressor wheel, 10, which forces the web of fabric down below the tops of the needles, while the loop on the needle, 7, is in line with the needle, 8, as above set forth; and, in order to fully locate said loop on the needle, 8, we provide another cloth-depressor wheel, 11, to further depress the web, so that the stitches are brought below the beards of the needles.

The stitch originally formed on the needle, 7, having been thus located upon the needle, 8, it becomes necessary to free said stitch from the needle, 7, before another loop of yarn is fed to the needle 7. This is accomplished by means of a three-and-one cut-presser, 12, adapted to close the beards of only those needles from which the stitches are to be transferred, said cut-presser acting in cooperation with a landing-wheel, 13, whereby said stitches are raised above the points of the beards of the needles, and a cast-off wheel, 14, whereby the stitches so landed are subsequently cast off, leaving the needles ready to receive a new feed of yarn in the usual manner.

In order to facilitate the transfer of the stitch by the above described mechanism, or other apparatus for accomplishing the same purpose, we provide a stitch-distending wheel, 15, mounted within the cylinder in position to engage the backs of the needles just before the needles pass into engagement with the alining-wheel, 3, the periphery of the distending-wheel being notched to receive the needles successively; and every fourth notch in its periphery adapted to receive a needle, 7, from which the stitch is to be transferred is partly filled in, as shown at, 16, and said distending-wheel has opposite each of said partly filled in notches, 16, a wedge-shaped blade, 17, projecting upward from the top surface of said wheel approximately to the upper end of the needle. A cloth-depressor wheel 18, is mounted to cooperate with the distending-wheel by forcing down the fabric to

carry the loop on each needle, 7, down upon the adjacent wedge-shaped blade, 17, to stretch out or distend said loop. By having the notch, 16, partly filled in or shallower than the other notches, the needle, 7, is forced slightly outward, causing it to press firmly against the outer side of the wedge-shaped blade and maintain close contact therewith while the stitch is being formed down over the blade to distend it. Every fourth stitch is thus distended, and, by proper adjustment of the several devices, it will be apparent that the stitches so distended can be afterward transferred in the manner above set forth, and that by reason of their having been so distended their tension has been relieved so that the transferring operation is facilitated.

While we have shown the several cloth-depressors in the form of wheels or disks, it will be understood that any of the known forms of cloth-depressor commonly employed in circular spring-needle knitting-machines may be employed.

We have shown the alining-wheel, 3, with the longer teeth, 6, located in advance of the shorter teeth, 5, adjacent to the respective slots, 4; but, for certain purposes of the invention, this feature is immaterial, and said wheel would operate in substantially the same manner if inverted, but with greater strain upon the displaced needles. The forward tooth on the alining-wheel acts more particularly as a guide and as a means for meshing with the needles to cause rotation of the alining-wheels, while the rear tooth forcibly displaces the needle which its beveled surface engages to bring said displaced needle into line with the next needle ahead thereof.

By making the forward tooth longer than the rear tooth, the same engages and intermeshes with the needles at an early period, but without material displacement of the needle which engages its beveled surface, said needle riding along said surface as the tooth advances with the needle.

The displacement of the rear needle which enters the slot, 4, is accomplished with the slightest possible bending of the needle in the preferred form of our invention, while at the same time we secure by the use of the longer tooth, 6, a long arc of engagement between the wheel and needles.

It will be apparent that if the device were arranged so that the longer teeth accomplished the principal bending or deflecting of the needles, the needle would necessarily be bent to a much greater degree.

The several wheels above described are mounted in the usual manner upon stationary parts of the machine not shown, by means of stands or brackets, the several brackets being shown partly broken away for convenience of illustration.

In Fig. 3, 20, indicates the knitted web and, 21, a stitch being distended by a wedge-shaped blade 17.

What we claim as new and desire to secure by Letters Patent is—

1. In a circular knitting-machine, and in combination, a needle-cylinder and needles; mechanism for automatically transferring a stitch from one needle to another; a wheel rotatively mounted to engage the needles in advance of said stitch-transferring mechanism, said wheel having wedge-shaped members thereon in position to be brought by the rotary movement of said wheel and cylinder adjacent to the respective needles from which stitches are to be transferred; and means for depressing the knitted web opposite said wheel whereby the stitches to be transferred are forced down upon and distended by the respective wedge-shaped members.

2. In a circular knitting-machine, and in combination, a needle-cylinder and needles; mechanism for automatically transferring a stitch from one needle to another; a wheel rotatively mounted within the cylinder and having a notched periphery adapted to mesh with the backs of the needles, and having at intervals corresponding with the intervals between needles from which stitches are to be transferred upwardly extended wedge-shaped blades; and a web-depressor opposite said wheel.

3. In a circular knitting-machine, and in combination, a needle-cylinder and needles;

mechanism for automatically transferring a stitch from one needle to another; a wheel rotatively mounted within the cylinder and having a notched periphery adapted to mesh with the backs of the needles, and having at intervals corresponding with the intervals between needles from which stitches are to be transferred upwardly extended wedge-shaped blades, said blades partly filling the notches whereat they are respectively located; and a web-depressor opposite said wheel.

4. In a circular knitting-machine, and in combination, a needle-cylinder and needles; and stitch-transferring mechanism comprising in part an alining-wheel engageable with the outer side of the needles and provided at desired intervals with radial notches each adapted to receive in radial alinement a needle from which and a needle to which a stitch is to be transferred, and having on the front side of each of said notches a comparatively long tooth beveled inward toward said notch, and on the rear side a comparatively short needle-deflecting tooth similarly beveled inward toward said notch.

In testimony whereof, we have hereunto set our hands this 20th day of September, 1910.

FRANK E. WILSON.
FREDERICK W. KNAPP.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."