

No. 864,433.

PATENTED AUG. 27, 1907.

R. W. SCOTT.

HOSIERY AND THE MODE OF MAKING SAME.

APPLICATION FILED SEPT. 20, 1905.

3 SHEETS—SHEET 1.

Fig. 1.

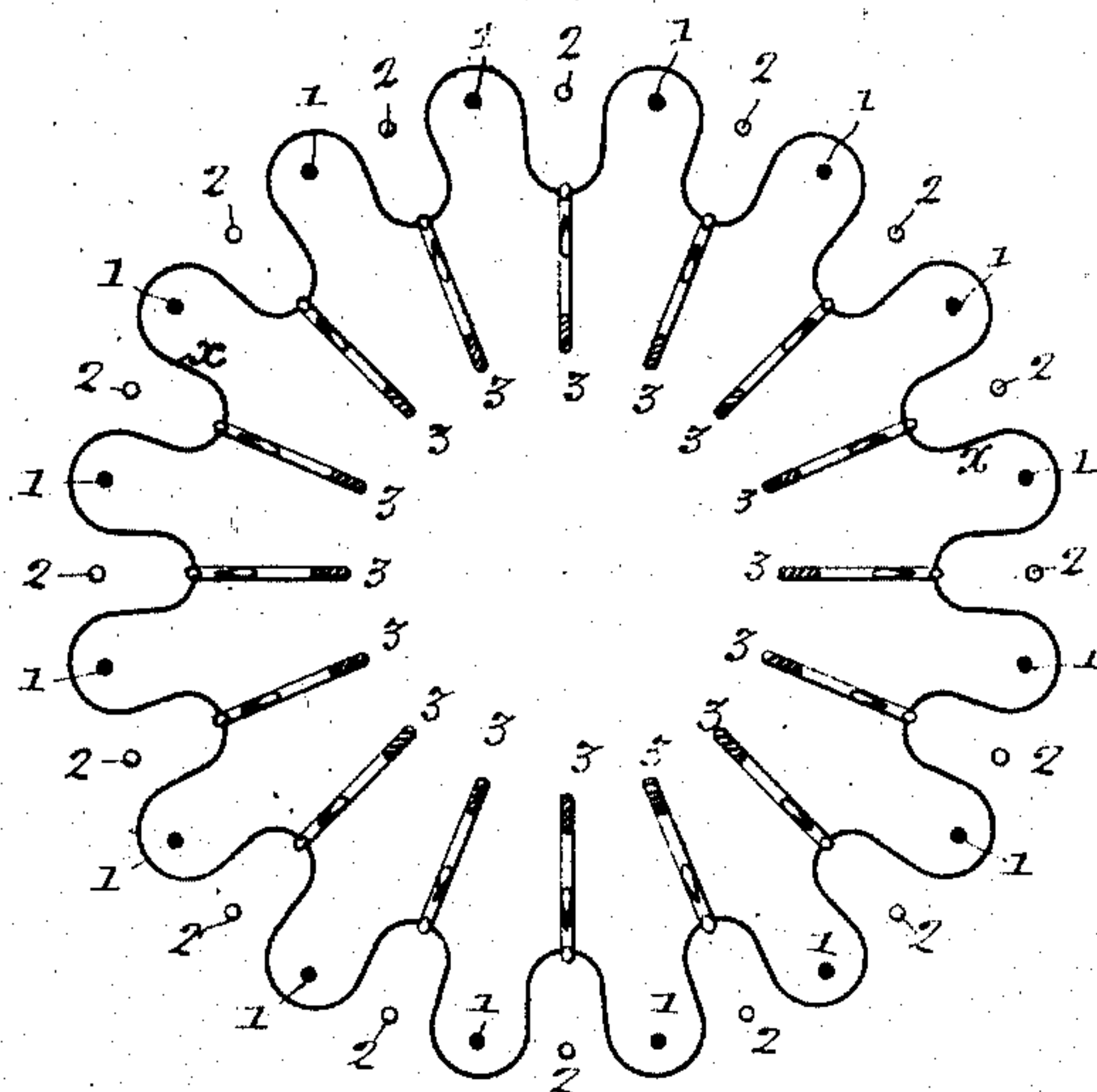
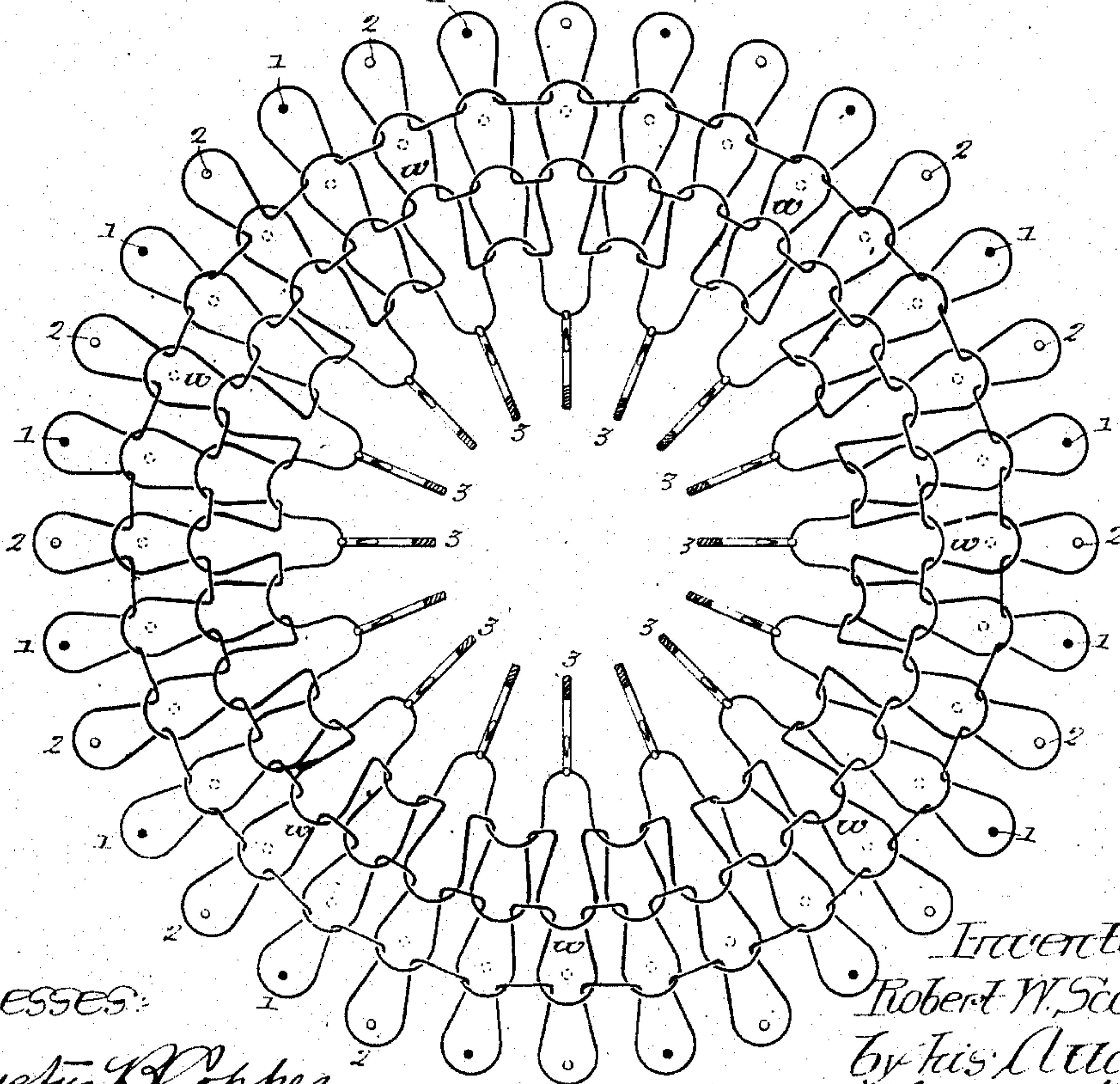


Fig. 2.



Witnesses:

Augustus D. Oppen
T. H. Birchhead

Inventor:
Robert W. Scott.

By his Attorneys
H. W. Brown & Co.

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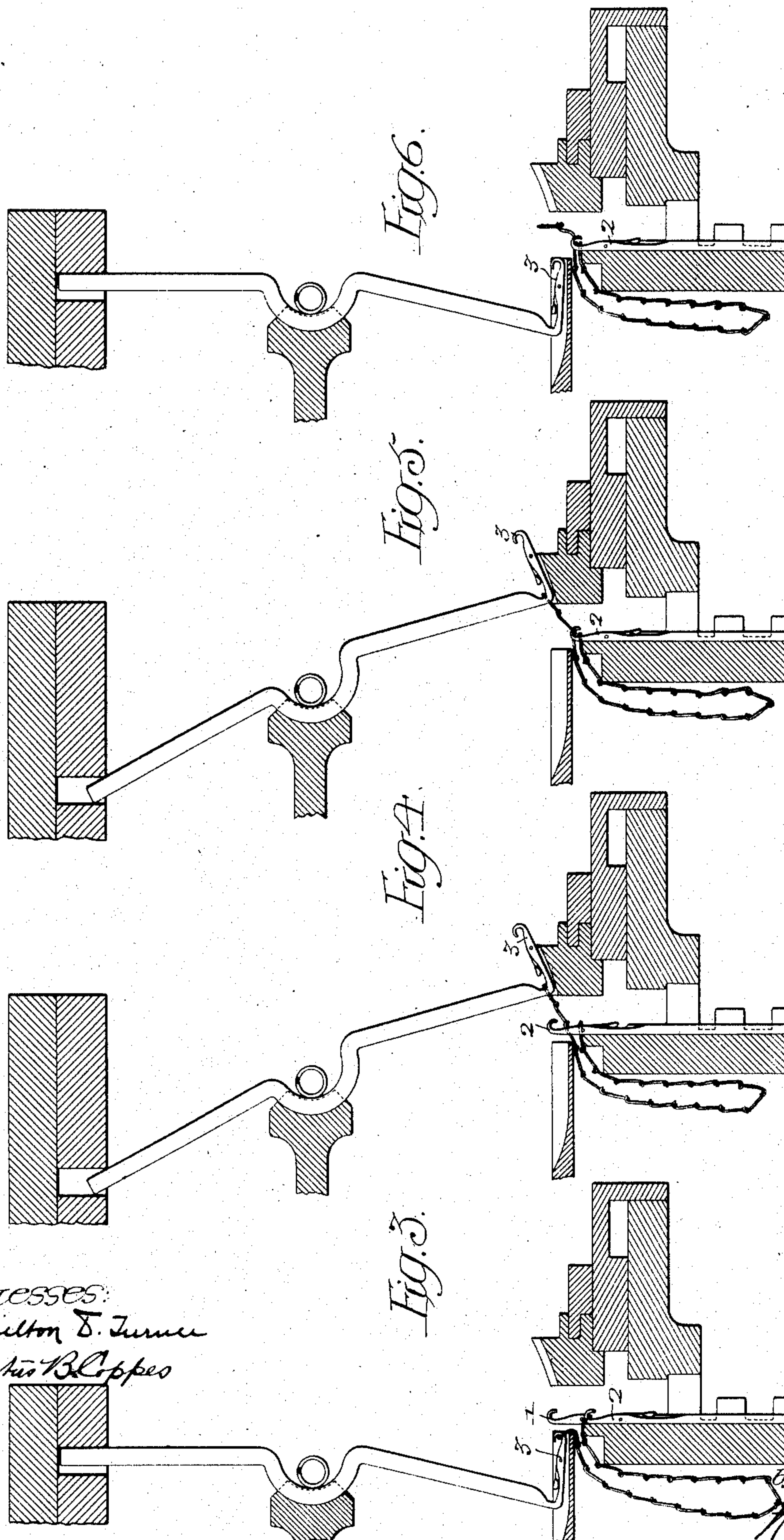
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3 SHEETS—SHEET 2.



Witnesses:
Hamilton D. Turner
Augustus B. Lopes

Inventor:
Robert W. Scott.
By his Attorneys
Beach & Brown

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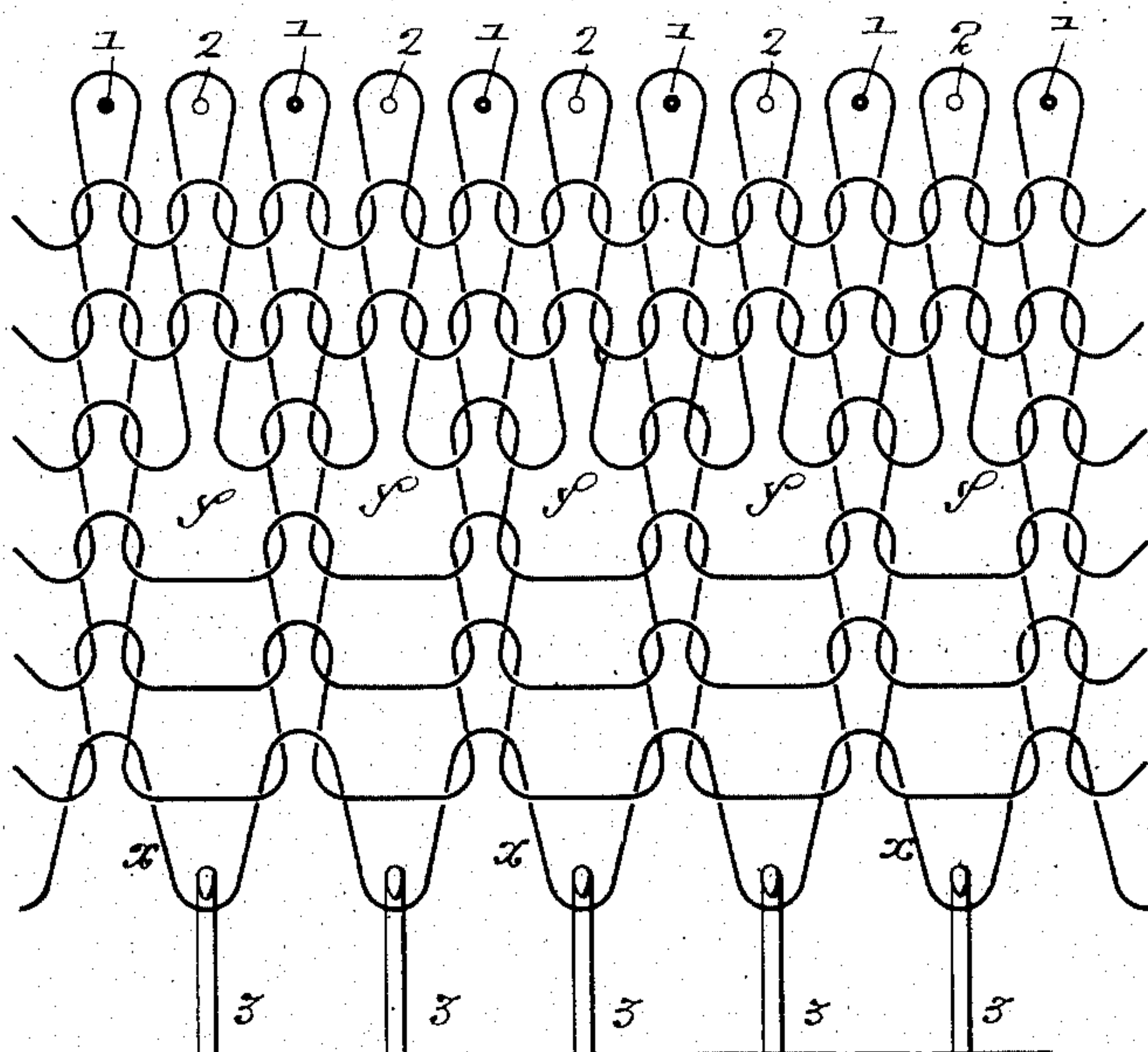
R. W. SCOTT.

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3 SHEETS—SHEET 3.

Fig. 7.



Witnesses:
Halter & Pullinger
Augustus B. Oppen

Inventor:
Robert W. Scott.
By His Attorneys
Howe & How

UNITED STATES PATENT OFFICE.

ROBERT W. SCOTT, OF LEEDS POINT, NEW JERSEY, ASSIGNOR OF ONE-HALF TO LOUIS N. D. WILLIAMS, OF OGONTZ, PENNSYLVANIA.

HOSIERY AND THE MODE OF MAKING SAME.

No. 864,433.

Specification of Letters Patent.

Patented Aug. 27, 1907.

Application filed September 20, 1905. Serial No. 279,308.

To all whom it may concern:

Be it known that I, ROBERT W. SCOTT, a citizen of the United States, residing at Leeds Point, Atlantic county, New Jersey, have invented certain Improvements in Hosiery and in the Mode of Making the Same, of which the following is a specification.

My invention relates to the manufacture of machine-knit hosiery and has reference to the formation of a welt or hem at the top of the leg by a certain operation of the machine upon which the stocking is knitted.

In the accompanying drawing, Figure 1, is a plan view, on an exaggerated scale, but with much less than the actual number of needles used in the machine, and illustrating the relation of the needles and disposition of the yarn thereupon in producing the first course of the knitting; Fig. 2, is a similar view after a few of the following courses have been knitted, this view, however, illustrating the cylinder needles in an expanded position so as to spread and fully illustrate the knitted web; Fig. 3, is a sectional view of the essential parts of the machine after the desired length of web for the welt has been knitted; Figs. 4, 5 and 6, are similar views illustrating successive steps in the operation of transferring stitches from the dial needles to the cylinder needles; and Fig. 7, is an exaggerated view illustrating a modification of the invention.

Ordinarily, long stockings composed of plain web, and made by one continuous operation on a circular seamless knitting machine capable of knitting seamless heel and toe pockets automatically, have the stocking finished at the top by turning in a hem thereon and sewing the inturned edge of the knitted web to a folded portion of the body thereof, so that the stitches will be formed through the web adjacent to said edge and partly through the body web, the needle passing through the folded portion of the latter so as to produce what is termed a concealed stitch. Great care is necessary on the part of the operator in performing this sewing operation, because it is customary to trim the raw edge of the knitted web close to the line of stitches, and unless this line of stitches is disposed closely adjacent to the folded edge of the web the latter is likely to be cut by the shearing mechanism of the machine, and these cut portions must be subsequently mended, thus involving additional expense, and, at the best, producing an imperfect stocking; furthermore, by this practice, the excess of material trimmed off by the cutting mechanism of the sewing machine is necessarily wasted.

In carrying out my improved method of forming welts or hems at the upper end of the leg tube of the stocking, all of these objections are avoided and a perfect turned welt, such as characterizes what is termed "full fashioned" hosiery is formed upon a seamless tube and by means which do not interfere with the

ordinary operation of the automatic seamless knitting machine in the performance of its other functions.

The machine has three sets of needles 1, 2 and 3, for instance the needles 1 and 2 may be those of the cylinder of an ordinary machine capable of knitting a seamless tube with heel and toe pockets thereon, but having also means for governing the operation of one set of needles independently of the other as hereinafter set forth, the needles 3 being guided by a dial similar to that of an ordinary rib knitting machine. The latter needles, however, cooperate with the cylinder needles only in the welt forming operation, hence at other times the machine operates simply as a machine for producing plain tubular seamless web, with heel and toe pockets.

In commencing the stocking, according to the preferable method, every other cylinder needle 2 is out of action and is replaced by a dial needle 3, the first course of yarn x being applied alternately to a cylinder needle 1 and to a dial needle 3, as shown in Fig. 1. The dial needles 3 are then retracted and held in the retracted position so as to retain the loops or stitches of yarn which have been applied to them, and the cylinder needles 2 are then brought into action, and seamless circular web is knitted upon all of the cylinder needles 1 and 2, as shown in Fig. 2, until a band of the desired width for the welt or hem has been produced, said band depending between the cylinder and dial needles as shown in Fig. 3. The machine should be equipped with the ordinary web holders, no take-up or tension devices being required. The cylinder needles 1, are now projected, but not to such an extent as to clear their stitches, as shown in Fig. 3, and the dial needles 3 are then thrust outwardly between said needles 1 to an abnormal extent, as shown in Fig. 4, so that while certain portions of the knitted web will be held within the circle of cylinder needles 1, intervening portions of said web will, by engagement with the hooked inner ends or portions of the stems of the dial needles 3, be carried outwardly beyond said circle of needles 1, as shown in said Fig. 4. The intervening cylinder needles 2 are then raised to such an extent as to enter stitches of the fabric drawn outward by said dial needles, the parts being so constructed, by preference, that the stitches thus engaged will be those which are knitted in a course following the loops first formed on the needles 3, as shown in Fig. 4, and by the dotted circles w in Fig. 2, the construction of the dial needles permitting the cylinder needles to rise in the same plane as said dial needles, and directly in the rear of the stitch-engaging portions of the same. The cylinder needles 2 are then lowered so that their hooks are below the level of the shanks of the dial needles 3, as shown in Fig. 5, and said dial needles are then retracted, as shown in Fig. 6, so as to cast the stitches upon them, ordinary circular knitting upon all of the

cylinder needles being then resumed for the production of the stocking leg, which will thus have formed upon it a properly turned welt or hem integrally united with the seamless circular tube.

- 5 Instead of employing, in the dial, half as many needles 3 as there are in the cylinder, and disposing them so that said dial needles correspond with alternate cylinder needles, 2, there may be only one dial needle for every three, four or more cylinder needles, in which
10 case there will be a correspondingly less number of points of attachment of the inturned edge of the welt to the body fabric, or the dial needles 3 may be arranged in pairs or groups corresponding with like pairs or groups 2 of cylinder needles, in which case the attachment of the inturned edge of the welt to the body, instead of being by single stitches, will be by pairs or
15 groups of stitches as will be readily understood.

- If it is desired to unite the inturned edge of the welt with every wale of the tubular web constituting the
20 body of the fabric, this can be accomplished by providing as many dial needles as there are cylinder needles, all of the dial needles being projected, while the cylinder needles are down, and said cylinder needles being then raised, so as to engage with stitches of the
25 knitted web, the dial needles on their retraction crowding or being shogged laterally past the projected cylinder needles, and casting off the loops originally formed upon said dial needles. In this case, as the dial needles cast their loops or stitches directly onto the raised
30 cylinder needles, the latter may if desired, be projected into the loops on the dial needles, instead of into a subsequently formed stitch. The transfer of stitches to the cylinder needles from a full set of dial needles, may also, if desired, be effected by successive operations, that is to say, the stitches may be transferred
35 from alternate dial needles to alternate cylinder needles in the manner first described and then in like manner the transfer of the intervening stitches may be effected from the remaining dial needles to the remaining
40 cylinder needles.

- It should be understood that the method of knitting with an initial setting-up course, as previously described, applies to the starting of an initial web. Seamless tubular web with heel and toe pockets may be produced in continuous lengths and a setting-up course
45 formed between successive circular courses of stitches, the fabric being afterwards cut, so that one or more courses of stitches will project beyond the uniting course, these courses of stitches being subsequently
50 raveled out up to said uniting course. The preferable plan, however, will be to start each stocking web independently, a few circular courses being knitted after the completion of the toe pocket, and the web being then cast from the needles, leaving the latter free for
55 the production of the next initial setting-up course. It will be evident also, that, instead of introducing the alternate cylinder needles 2, immediately after the formation of the setting-up course upon the needles 1 and 3, tubular web may be knitted upon the cylinder needles 1, for about one-half of the length necessary for the
60 welt, and the alternate cylinder needles 2, may then be brought into action, the result being that the internal portion of the welt will have only one-half as many wales as the outer or exposed portion of the same, but
65 as the eyelet holes *y* formed at the point of introduction

of the needles 2 will, in this case, be at the top or in the inner portion of the welt, they will not, in practice, prove objectionable. This form of web is shown in Fig. 7, which however, shows a much less number of courses than would be present in the actual web. 70

In some of the claims, I have used the terms "primary" and "secondary" needles, the term "primary" applying to those needles upon which the tubular web is produced, and the term "secondary" to those needles which receive yarn only in making the setting-up
75 course and effect such disposition of the knitted web that the other needles may engage with the same, and it is evident that although, in the present case, the cylinder needles are the primary needles and the dial needles are the secondary needles, the reverse of this
80 may be true, without departing from the main spirit of my invention.

Having thus described my invention, I claim and desire to secure by Letters Patent:—

1. A machine-knit seamless tubular web having a turned
85 welt or hem with stitches of a course of the inturned portion integrally united with wales of the body web, said inturned portion having one or more courses of stitches in advance of the engaged course.
2. A machine-knit seamless tubular web having an in-
90 turned welt or hem thereon, with alternate loops or stitches of a course of the inturned portion integrally united with wales of the body web.
3. A machine-knit seamless tubular web having an in-
95 turned welt or hem thereon, with alternate stitches of a course of the inturned portion integrally united with wales of the body web, said inturned portion having one or more courses of stitches in advance of the engaged course.
4. The mode herein described of producing a machine-
100 knit web having an integrally united turned hem or welt thereon, said mode consisting in first forming a setting-up course of stitches upon two sets of needles, retiring the secondary set but permitting them to retain their stitches, knitting a proper number of courses of stitches upon needles of the primary set, projecting needles of the secondary set so as to carry loops or stitches of the web into the path of needles of the primary set, engaging said loops or stitches by said primary needles, and then retiring the needles of the secondary set and casting the stitches there-
105 from.
5. The mode herein described of producing a machine-
110 knit web having an integrally united turned hem or welt thereon, said mode consisting in first forming a setting-up course of stitches upon two sets of needles, retiring the secondary set but permitting them to retain their stitches, knitting a proper number of courses of stitches upon needles of the primary set, projecting the needles of the secondary set so as to carry loops or stitches of the web into the path of alternate needles of the primary set, engaging
115 said loops or stitches by said alternate primary needles, and then retiring the needles of the secondary set and casting the stitches therefrom.
6. The mode herein described of producing a knitted
120 web having an integrally united turned hem or welt thereon, said mode consisting in first forming a setting-up course of stitches upon two sets of needles, retiring the secondary set, but permitting them to retain their stitches, knitting a proper number of courses of stitches upon needles of the primary set, projecting the needles of the secondary set while the corresponding primary needles are retracted, thereby carrying certain stitches of the web into the path of said retracted primary needles, then engaging said stitches by said primary needles, and then retiring the needles of the secondary set and casting the
125 stitches therefrom.
7. The mode herein described of producing a knitted
130 web having an integrally united turned hem or welt thereon, said mode consisting in first forming a setting-up course of stitches upon two sets of needles, retiring the
135

secondary set but permitting them to retain their stitches, bringing into action needles of the primary set corresponding to said retired secondary needles, knitting a proper number of courses of stitches upon the needles of the primary set, projecting the needles of the secondary set, so as to carry certain stitches of the web into the path of the corresponding primary needles, then engaging said stitches by said primary needles and then retiring the needles of the secondary set and casting the stitches therefrom.

8. The mode herein described of producing a knitted web having an integrally united turned hem or welt thereon, said mode consisting in first forming a setting-up course of stitches upon two sets of needles, retiring the secondary set but permitting them to retain their stitches, bringing into action needles of the primary set corresponding to said retired secondary needles, knitting a proper number of courses of stitches upon the needles of the primary set, projecting the needles of the secondary set, when the corresponding primary needles are retracted, so as to carry certain stitches of the web into the path of the corresponding primary needles, then engaging said stitches by said primary needles and then retiring the needles of the secondary set and casting the stitches therefrom.

9. The mode herein described of producing a knitted web having an integrally united turned hem or welt thereon, said mode consisting in first forming a setting-up course of stitches upon two sets of needles, retiring the secondary set but permitting them to retain their stitches, knitting a proper number of courses of stitches upon needles of the primary set, projecting the needles of the secondary set so as to carry into the path of corresponding and retracted primary needles, stitches of the web which have been formed subsequently to those upon the projected secondary needles, engaging said stitches by said primary needles, and then retiring the needles of the secondary set and casting the stitches therefrom.

10. The mode herein described of producing a knitted web having an integrally united turned hem or welt thereon, said mode consisting in first forming a setting-up course of stitches upon two sets of needles, retiring the secondary set but permitting them to retain their stitches, bringing into action needles of the primary set corresponding to said retired secondary needles, knitting a proper number of courses of stitches upon the needles of the primary set, projecting the needles of the secondary set so as to carry into the path of corresponding and retracted primary needles, stitches of the web which have been formed subsequently to those upon the projected secondary needles, engaging said stitches by said primary needles, and then retiring the needles of the secondary set and casting the stitches therefrom.

10. The mode herein described of producing a knitted web having an integrally united turned hem or welt thereon, said mode consisting in first forming a setting-up course of stitches upon two sets of needles, retiring the secondary set but permitting them to retain their stitches, bringing into action needles of the primary set corresponding to said retired secondary needles, knitting a proper number of courses of stitches upon the needles of the primary set, projecting the needles of the secondary set so as to carry into the path of corresponding and retracted primary needles, stitches of the web which have been formed subsequently to those upon the projected secondary needles, engaging said stitches by said primary needles, and then retiring the needles of the secondary set and casting the stitches therefrom.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ROBERT W. SCOTT.

Witnesses:

KATE A. BEADLE,
JOS. H. KLEIN.