

(No Model.)

C. WINTERBOTTOM.
ART OF KNITTING STOCKINGS.

No. 249,283.

Patented Nov. 8, 1881.

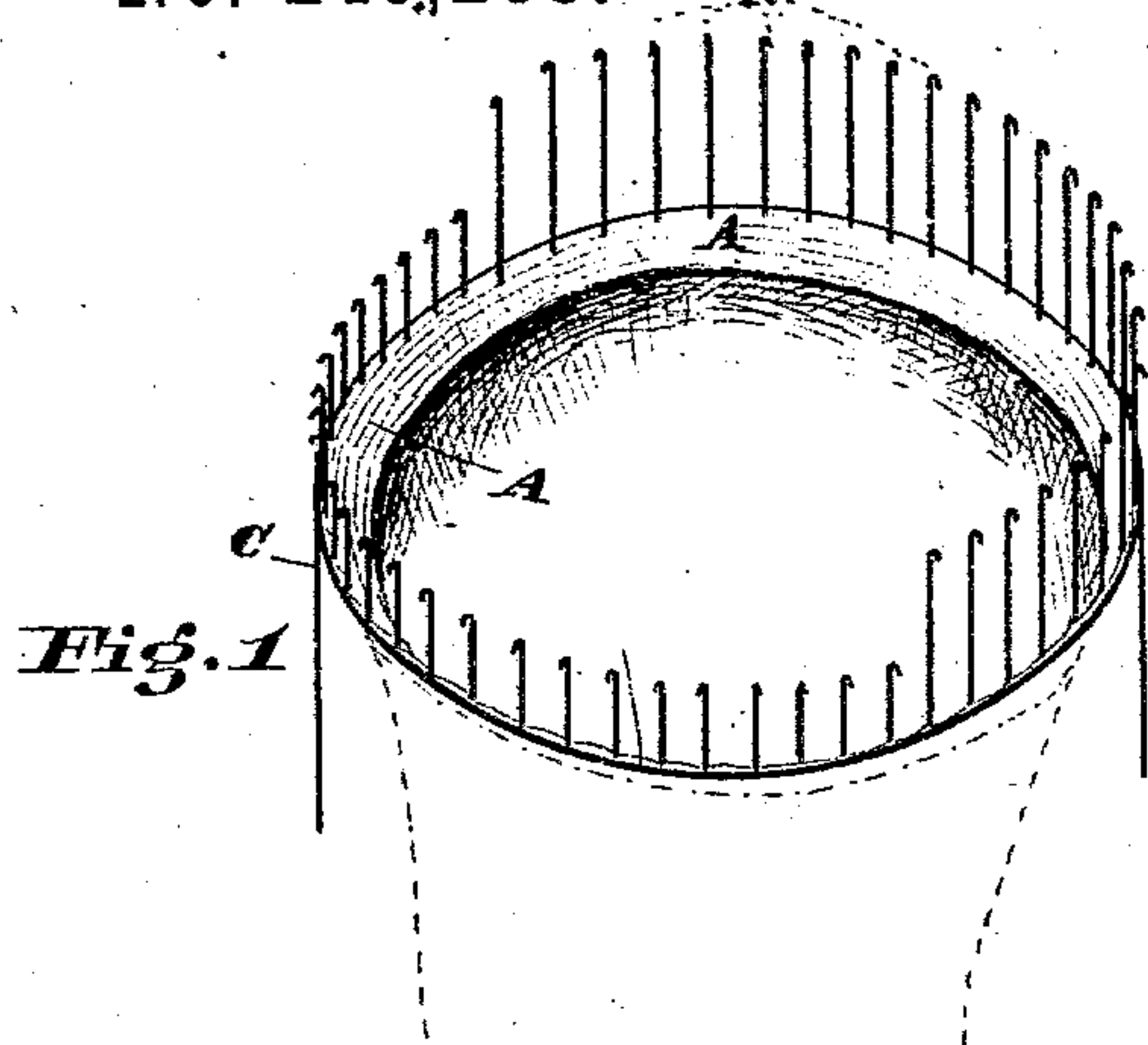


Fig. 1

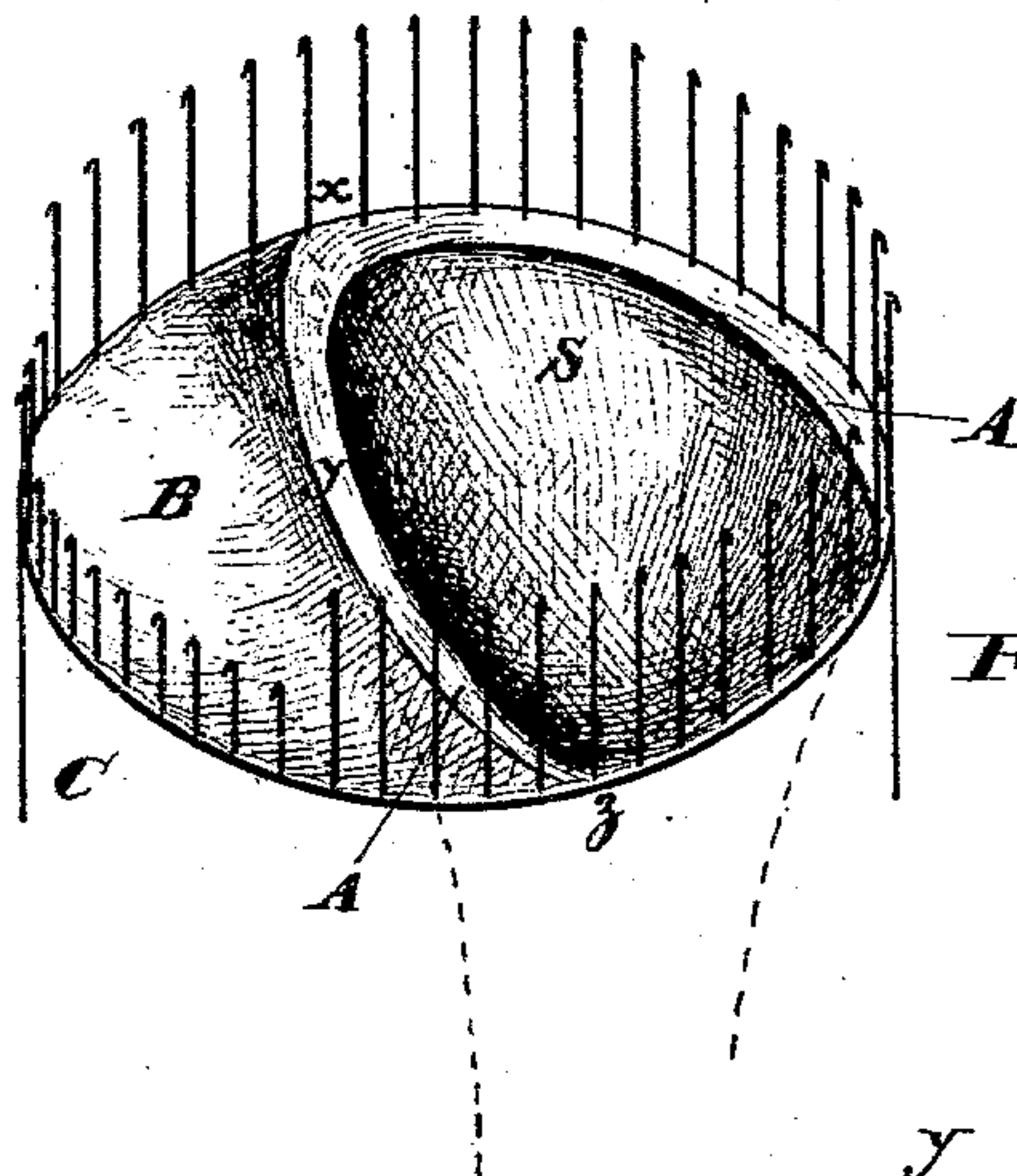


Fig. 2

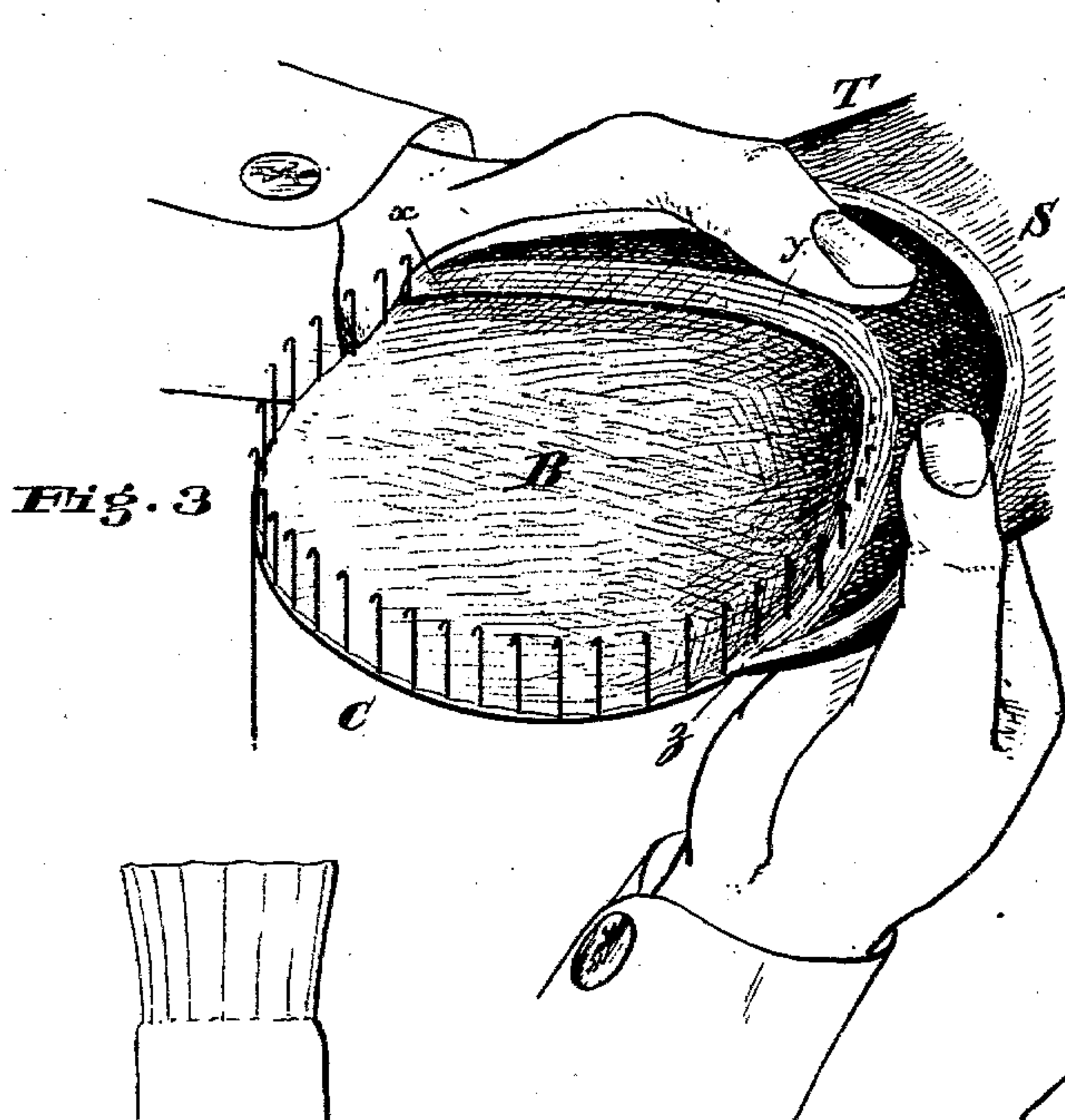


Fig. 3

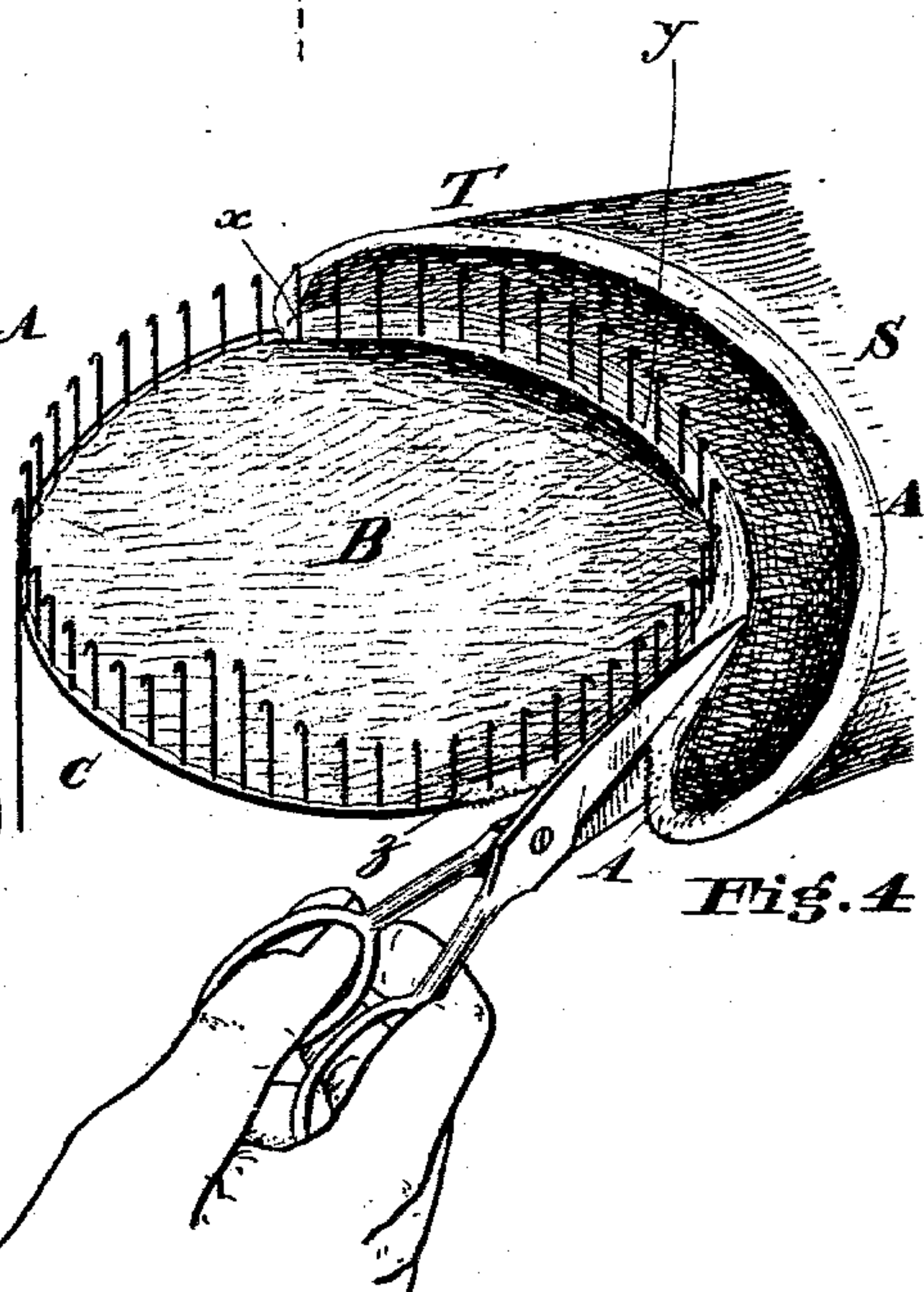


Fig. 4

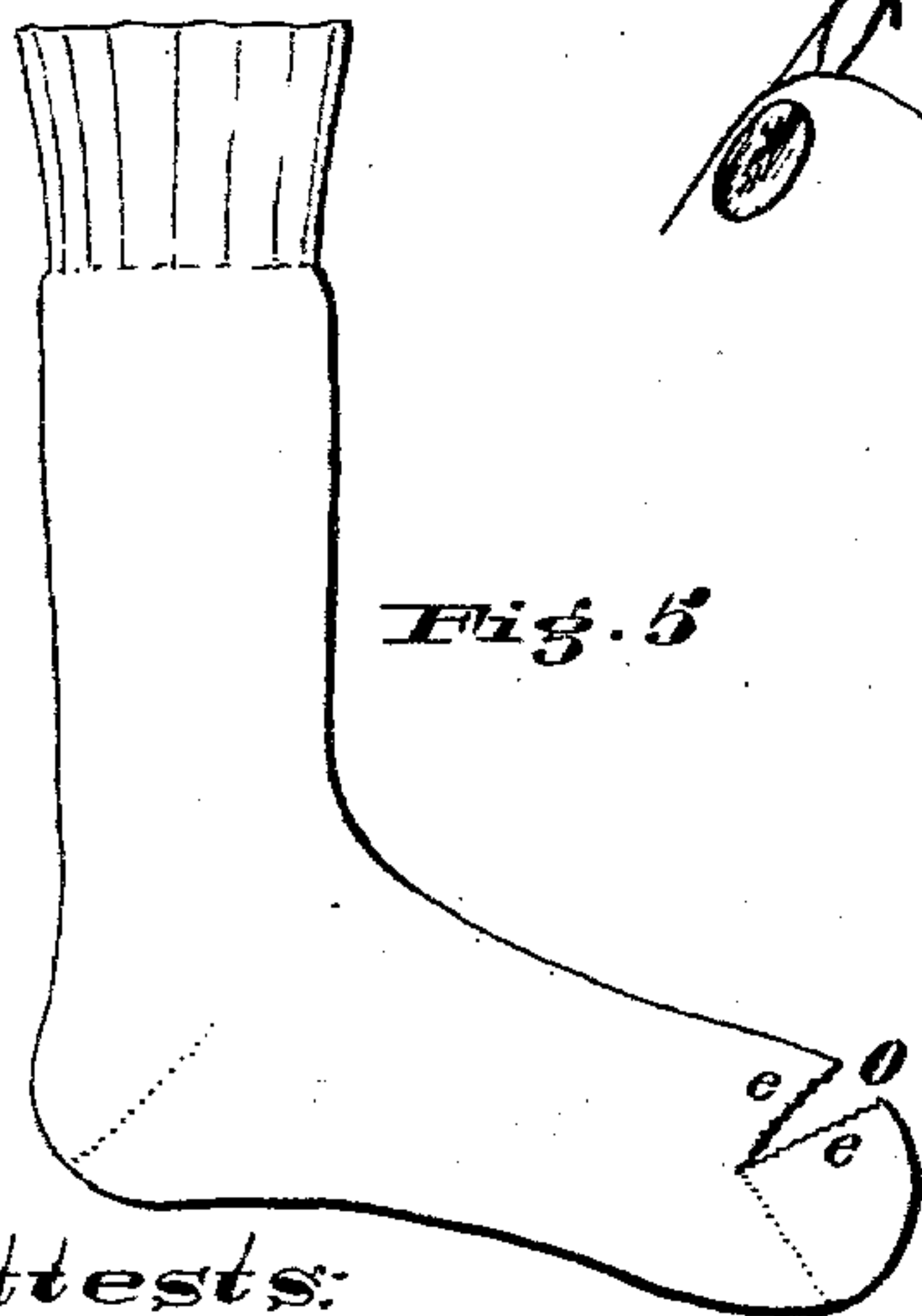


Fig. 5

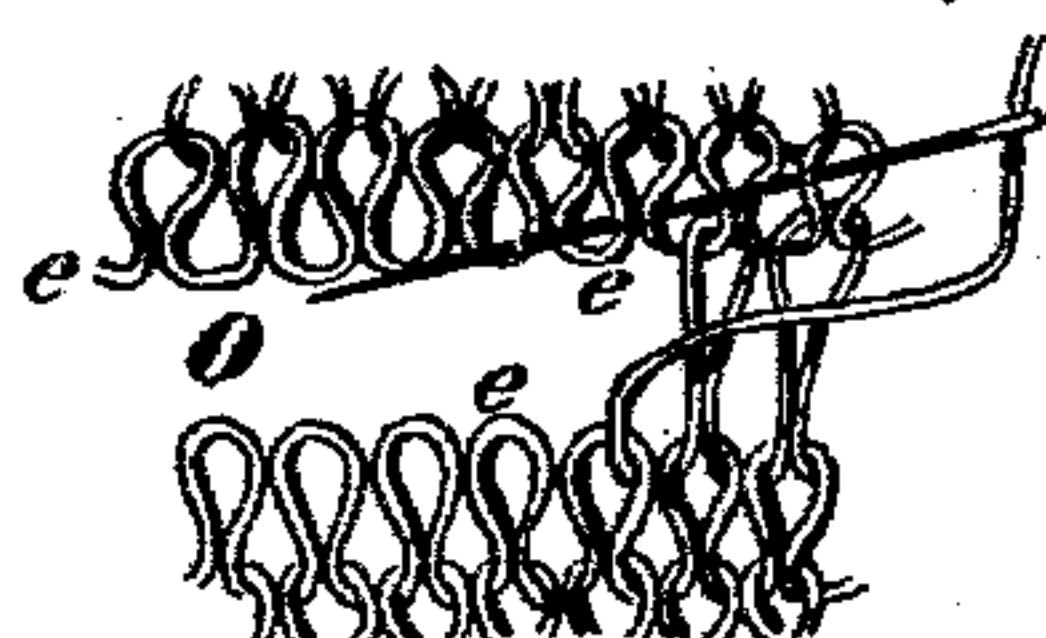


Fig. 6

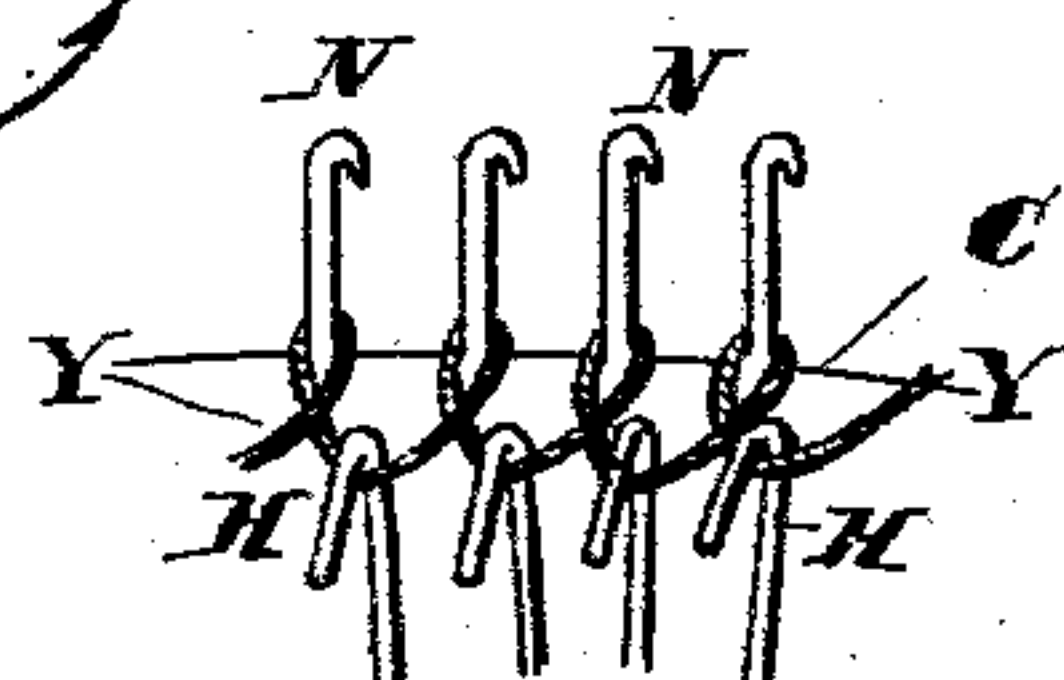


Fig. 7

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ART OF KNITTING STOCKINGS.

SPECIFICATION forming part of Letters Patent No. 249,283, dated November 8, 1881.

Application filed April 26, 1880. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WINTERBOTTOM, a citizen of the United States, residing at the city and county of Philadelphia, and State of Pennsylvania, have invented new and useful Improvements in the Art of Knitting Stockings; and I do hereby declare that the following is a full, clear, and exact description of the invention, sufficient to enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the art of knitting seamless stockings with that class of knitting-machines operating upon the principle of those having needle and cam cylinders—such, for example, as the patented Branson, Bickford, or Tuttle machines; and its object is to save time and labor in making stockings by such machines. This is attained by an improved mode of manipulating the knitting-machine and the work made by it at certain stages, as will hereinafter appear in detail.

That my improvements may be clearly understood by comparison, I shall first state, in a general way, the most usual method of knitting a seamless stocking by a circular machine, referring, as may be necessary, to the accompanying illustrations.

The stocking is begun at the top and ended at the toe portion. The first round of stitches is started by means of the "set-up," the yarn being looped under the hooks of the set-up and around the needles, as seen in Figure 7, *y* being the yarn looped around the needles *N* and set-up hooks *H*. The setting up is repeated in beginning to knit every stocking. The machine is now operated and the stocking knit and thrown off the needles in a manner well known to those skilled in the art. It is, however, not yet complete, for there remains the toe-gap *O*, Fig. 5, to be closed up. This is usually done by drawing the opposite stitches together by means of needle and thread, as shown in the magnified view, Fig. 6. A stocking made substantially in this way is termed a "seamless" stocking. In forming the toe part all the needles of one half the cylinder *C* must first be lifted up—that is, put out of operation—as seen in Fig. 1. The knitting then proceeds by running the machine backward and forward, a needle on each side alternately

of the down half being lifted at each reciprocation until the fabric is sufficiently narrowed—that is, until about one-third on each side of the number of needles of the half-circle left in operation have been lifted—then widened by pushing down these needles, one at a time, as the machine knits across and back. It is not necessary to further describe this operation of forming the toe part of the stocking or in nice detail, as those who are fairly skilled in working said machines are familiar with the process.

It is to be observed that the foregoing method of making a finished seamless stocking requires, first, the setting up at the beginning of every stocking; second, that to properly form the toe a number of needles of one half the cylinder must first be lifted up and afterward pushed down, one at a time; third, the stocking, after having been finished by the machine, must be closed at the toe. Each of these operations consumes some time. Now, my improvement enables me to avoid them all, save only that, in knitting the toe portion, I need to lift up a few of the needles, one by one, of the down half at a certain stage, as hereinafter explained.

Another method of knitting seamless stockings is shown and described in McNary's Patent No. 64,241, of April 30, 1867, in which the stocking is begun at the toe and finished at the top, and a continuous series of stockings is knit, they being afterward separated by cutting off near the line of junction of the top of one stocking and the toe-pouch of the next stocking.

I shall now proceed to elucidate my mode of operating, and to point out wherein it differs from the most usual plan, first above mentioned, of knitting stockings by machines of the class aforesaid, reference being had, as the description proceeds, to the accompanying drawings. In these like letters always designate like parts. The only part of a machine necessary to be shown for my purpose is the circle of needles *N* in cylinder *C*.

In Fig. 1 let it be supposed that the very first stocking *S* made by my improved method has received its last course of stitches (at the top) and is hanging down within the cylinder and a few additional rounds of quite loosely-

knit stitches have been run off, forming a ring of demarkation, A. The latter is intended to assist in facilitating the throwing on of certain stitches, as hereinafter described. This is an important feature of my plan. A new stocking is now to be made. First, the needles of half the cylinder are all lifted up, as in the old way, preparatory to knitting the toe. It may be either the front or the back half thus suspended from operation, whichever may be more convenient. I now knit across back and forth a number of courses equal to about one-third of the needles left to work. Here I effect a saving, as in forming the toe part in the old way the lifting up of the needles one by one begins as soon as the toe is commenced, as before described. Next, I narrow the fabric by lifting a needle at each reciprocation of the machine until the usual number as in the old plan first aforesaid—that is, about one-third of the half-circle of needles left in operation—are thus raised on each limb thereof, as seen in Fig. 2. I am not now obliged, in order to complete sufficient web for the fashioning of the toe, to push down these latter needles one at a time, as I have stated is done in knitting stockings by the old method, the latter requiring this to be done in order to widen, while I knit several courses even, and then narrow, as described, but do not widen. Thus I effect a second important saving. It will be observed that in knitting the toe-pouch in this way I make substantially the same number of stitches as in the old way first aforesaid, (or any other method known to me,) the saving being effected in the *modus operandi*, the which I am enabled to do by commencing the stocking at the toe, as described. The appearance of the work at this stage is shown by Fig. 2, the web B being the toe part of the stocking thus formed preparatory to the next operation. This is as follows: After detaching the weight usually hung to the knitted web depending within the cylinder and having pushed down all the raised needles in Fig. 2, I lift off the half-circle row of stitches of the ring A, (which have, of course, remained in *statu quo* on the idle needles while the web was in process of formation.) I then draw the stocking S up through and above the needle-cylinder C, not, however, turning the stocking inside out, seize hold of the top part, T, of the stocking, as represented in Fig. 3, and deftly cast on the same needles, in place of the row of stitches or loops just taken off, the identical row of stitches $x y z$, Figs. 2, 3, and 4, next to the ring A, which stitches had necessarily been thrown off in knitting the toe portion of the stocking. The ring of demarkation greatly facilitates this operation, an expert operator throwing on a number of the stitches of the row simultaneously and quickly. As the formation of the toe was begun at the first row of stitches, $x y z$, next the web A—that is to say, when one-half the needles, Fig. 1, had been raised—it follows that the number of the said first row is equal to one-half the circle of needles.

The foregoing statement as to casting onto the idle needles the identical row of stitches $x y z$ is intended to be a general or substantial statement of that part of my method. In fact, however, if all the stitches $x y z$ be thus thrown on a gap or hole will be left on each side of the toe-pouch, the size of which will depend upon the amount of stuff—i. e., the number of courses knit without raising the needles. Therefore, in order to avoid this, I, instead of really casting on all of said stitches throw on the larger portion thereof, and also a few stitches of the web on each side a short distance in from the outer (selvage) side rows of stitches, so as to take up the surplus web, which, if not disposed of, would cause said gaps. The sum of the stitches, $x y z$ row, thus cast on and the few taken from the sides and cast on should, to make a perfect job, equal the number of the half-circle of needles, or, in other words, the number of the stitches $x y z$. This surplus web is cut off when the stocking is separated from the toe-pouch, as hereinafter mentioned. In Fig. 4 this operation of casting on, represented as in progress by Fig. 3, is shown completed and the operator in the act of separating with scissors that portion or half-circle of web which connects the completed stocking S with the web on the needles. The cylinder end being now thus spanned by the toe-web B, the remainder of the stocking may be finished in the usual way, reversing, however, the most customary order of succession as to knitting the different parts of the stocking. In ending off the stocking previous to knitting the rounds A, I knit several rounds as tight as can conveniently be done compared with those adjacent, and in order to do this as effectually as may be done, I knit the stockings with as small gage needles as it is practicable to use in knitting the particular style or quality of goods being made, as the finer the needles the tighter these stitches can be made, as compared with those of the other parts of the stocking. The object of thus ending off with tightly-knit stitches I explain as follows: In preparing the stocking for the market I usually clip off the top near the ring A, so that the former will end off with the tight stitches. These do not easily ravel and they become more firmly set after the stocking has been washed. The object in knitting several rounds of these tight stitches is obvious, the tops being clipped off somewhat at random by scissors.

When the stocking is completed a new one is again started at the toe part, and the operations I have just described are repeated, as desired.

My invention differs essentially from that shown in the said McNary patent in this, that I employ the ring of demarkation A; that I draw the stocking up through the cylinder of the machine and use it in casting on the stitches of the toe-pouch, as before described; and that I tighten up the stitches at the top of the stocking near the line of separation for the purpose specified.

I am aware of the Branson and Nelson patent No. 156,838, of November 17, 1874. It is therein stated that the connection of the toe-pouch with the foot is made at the upper side of the toe at a point where there is the least wear. As in my method the same stitches *x y z* that were thrown off in beginning to knit the toe-pouch are cast onto the idle needles and the knitting is then proceeded with, it makes no difference whether the connection be made on the upper or the lower side of the toe, the same by my method being equally strong as any of the stitches of the fabric.

I am also aware of the House Patent, No. 112,346, of March 7, 1871, wherein is described a series of stockings made continuously, and separated by a draw-string; but it is plain that the line of demarkation A used by me is entirely different from House's draw-string, and is for a different purpose.

It is evident that the finished stocking might be thrown off or separated from the ring A just before beginning the toe-pouch of the succeeding stocking; but I do not recommend this to be done on account of its requiring the setting up with every stocking. When knitting in this latter way I first make the ring A, then the toe-pouch, as described, finish off the stocking at the top and throw it off the needles as in the usual way, first hereinbefore mentioned, repeating the whole operation, as desired.

When the knitting is in progress the web is suitably weighted, as in the usual way. After the toe-web B is made to span the cylinder, as in Fig. 4, it may be used as a receptacle to hold the weight or weights; or these may be hooked or clamped onto the web, as in the customary way. Of course, in beginning to knit stockings for the first on the machine, if there should be no web already on the needles, the first round of stitches will have to be set up in some way. A few rounds of the loose web A may then be knit, just sufficient to serve as a holdby when the web B is done, in order to aid in throwing on the stitches, as in the manner shown in Fig. 3. There is another advantage in knitting the stitches A loosely, that when taken off the needles just previous to casting on the stitches of the toe-web they will come off readily.

It may be observed that a semicircle of demarkation could be knit and used nearly as well as the circle.

In case the stocking is knit with two or more threads at once of the same or different colors, as is quite usual, a well-defined ring, A, may be made by breaking off one or more of the threads before beginning the latter, or such a line may be made by using a differently-colored thread from that of the adjacent stitches of the toe-pouch.

I may state that so far as concerns the knitting of the toe-pouch of a stocking preparatory to the throwing on of the stitches, as described, this might be done by lifting up and pushing down needles—that is, narrowing and widening, as in the old way. I could not, however, shape the toe-pouch in the economical way invented by me, as hereinbefore detailed, without commencing the toe part of the stocking in the manner described.

Having thus clearly described my invention, so that others skilled in the art to which it appertains may readily practice the same, what I claim as new, and wish to secure by Letters Patent, is—

1. The method of knitting machine-made seamless stockings consisting of the following continuous operations: first, knitting a distinctive ring of demarkation, as and for the purposes mentioned, then knitting the toe-pouch in the manner described, then disengaging the stitches of the said ring remaining on the half-circle of idle needles, then throwing onto the idle needles the stitches which have been thrown off the opposite needles in beginning to knit the toe-pouch, then bringing into operation all the needles of the machine and proceeding to knit the remaining parts of the stocking in the usual manner, substantially as described.

2. The method of knitting machine-made seamless stockings which consists in knitting a ring of demarkation of loosely-formed rows of stitches, then knitting the toe-pouch of the stocking in the manner described, then with the aid of said ring throwing onto the idle needles the stitches which have been thrown off in beginning to knit the toe-pouch, then bringing into operation all the needles of the machine and knitting the remainder of the stocking in the usual manner, all substantially as shown and described.

3. The method of knitting machine-made stockings which consists in first knitting a distinctive ring of demarkation, then knitting the toe-pouch, then disengaging the stitches of the said ring remaining on the half-circle of idle needles, then drawing the previously-finished stocking up through the cylinder above the needles thereof, then throwing onto the idle needles the stitches which were thrown off the opposite needles in beginning to knit the toe-pouch, then separating the finished stocking from the toe-pouch on the needles, and completing the newly-begun stocking in the usual way, substantially as described.

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Witnesses:

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ASHBEL E. WARE.