

(No Model.)

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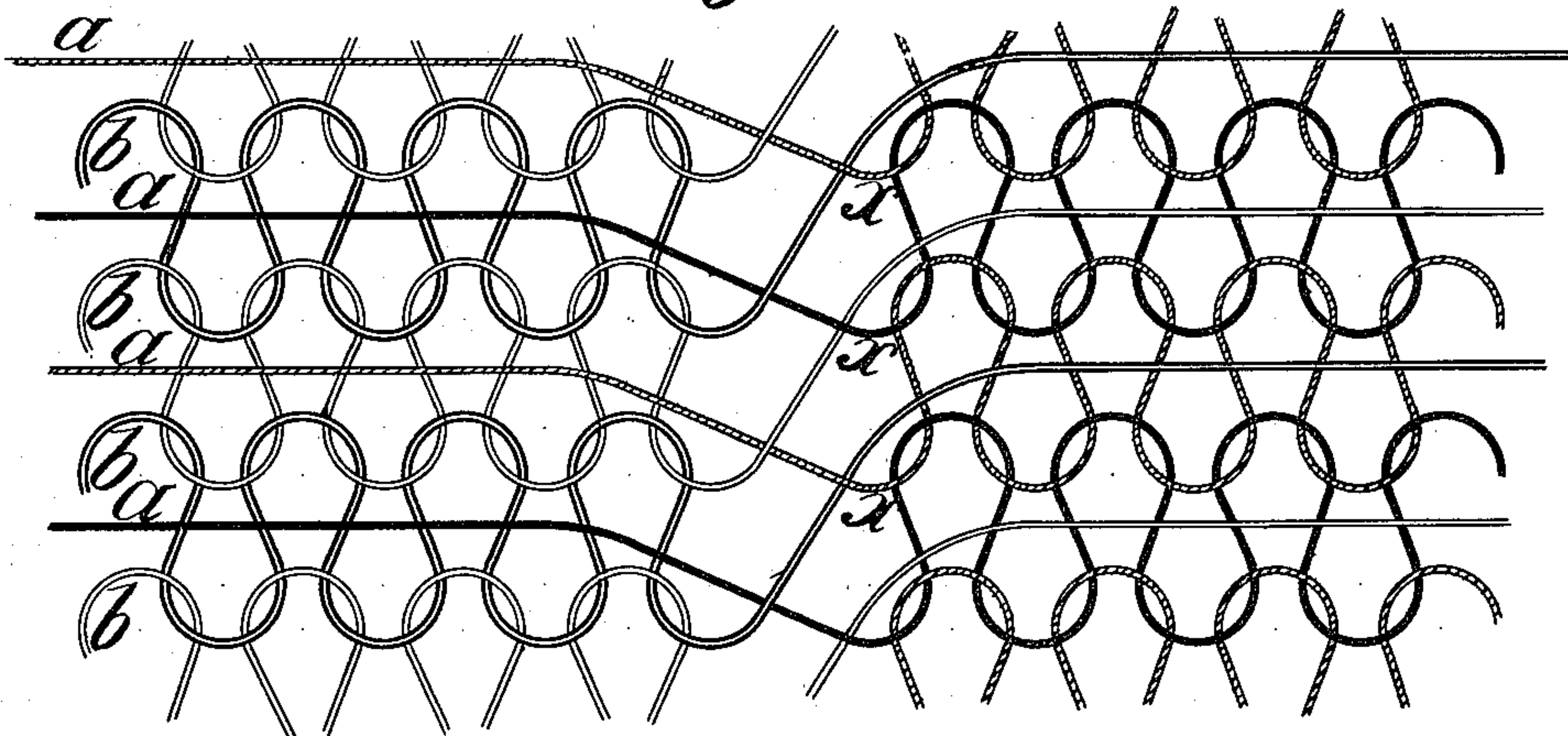
J. SCHIESSER.

CIRCULAR KNITTING MACHINE FOR TUCK STITCH GOODS.

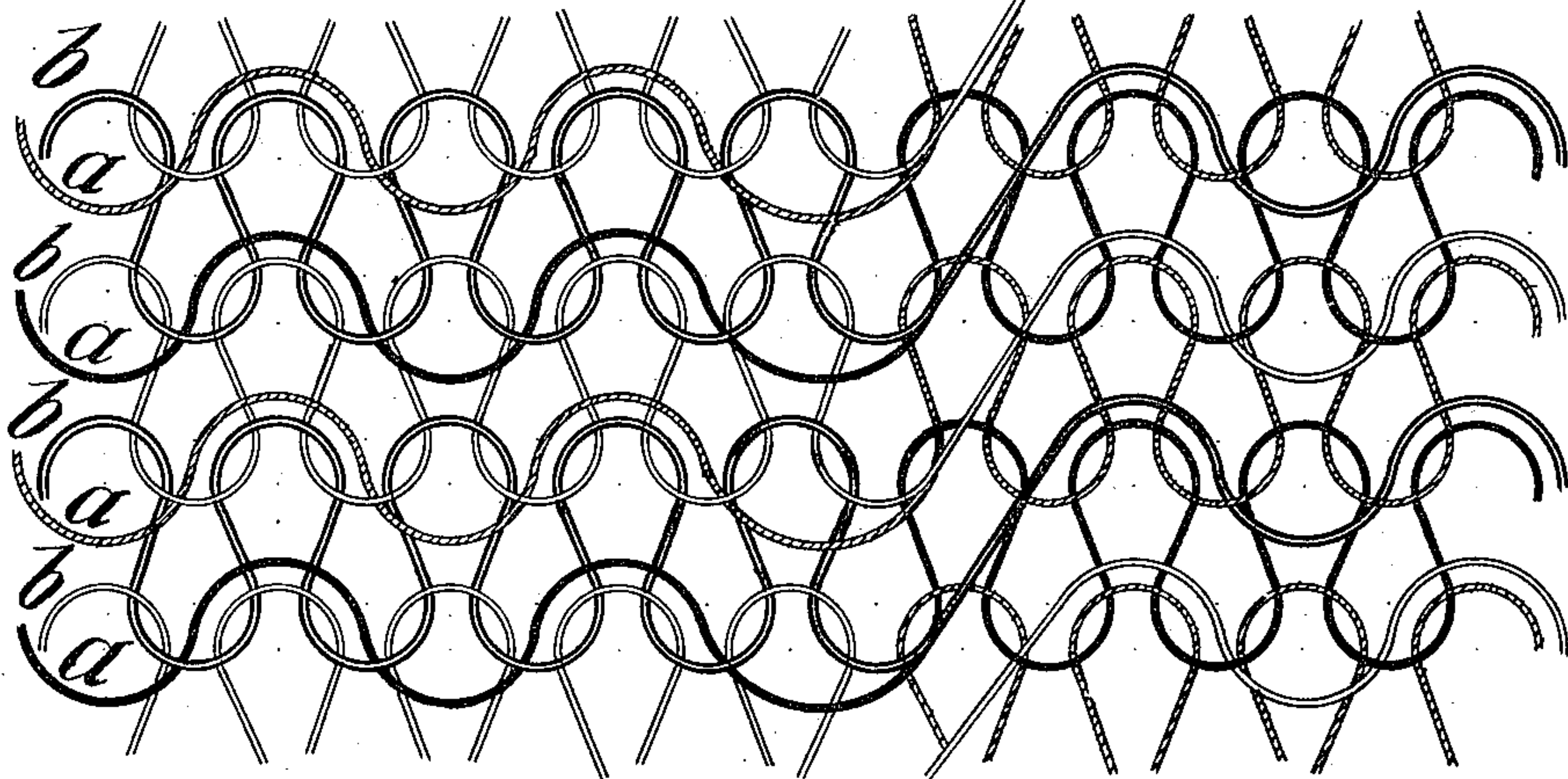
No. 547,684.

Patented Oct. 8, 1895.

*Fig. I.*



*Fig. II.*



Witnesses  
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(No Model.)

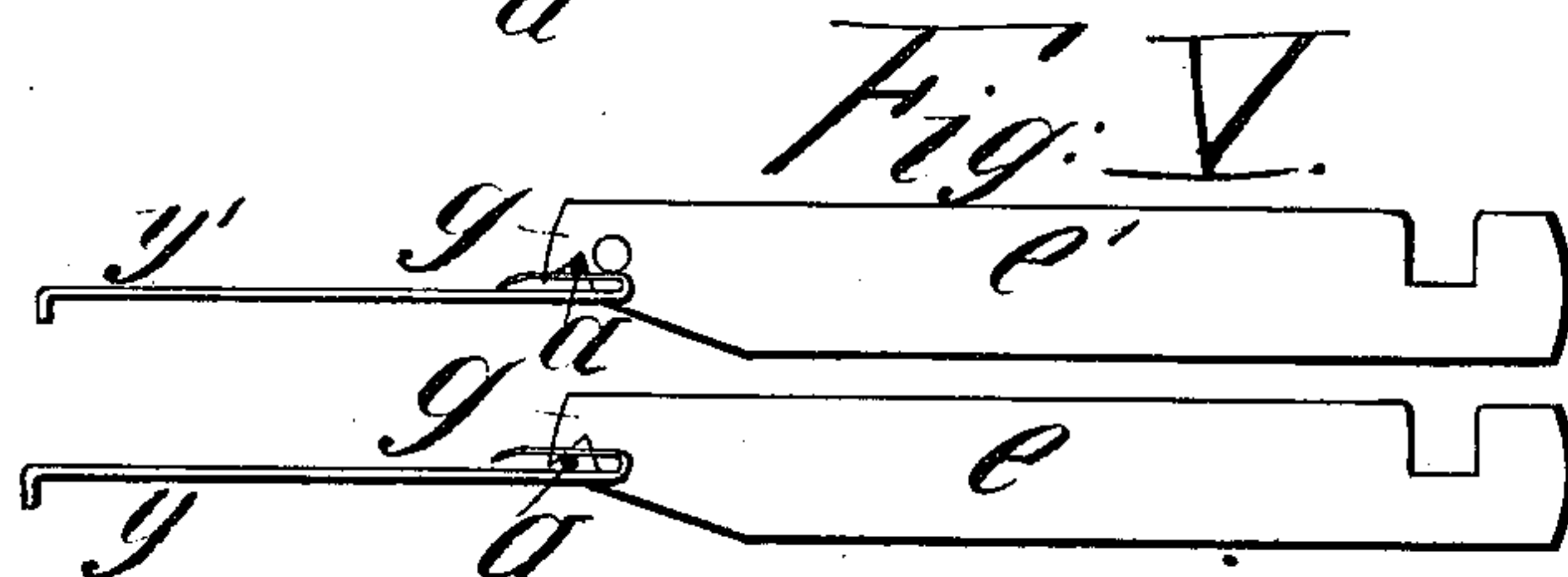
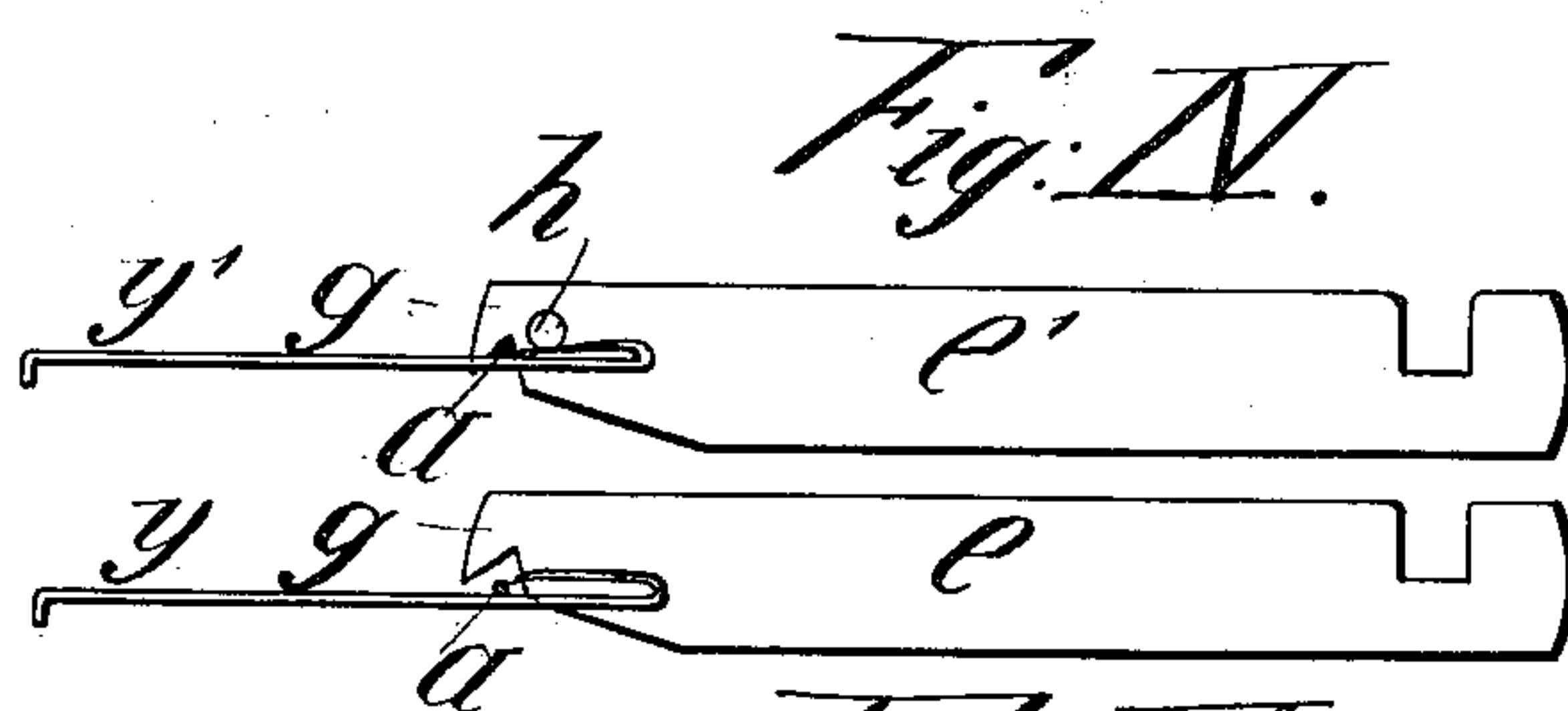
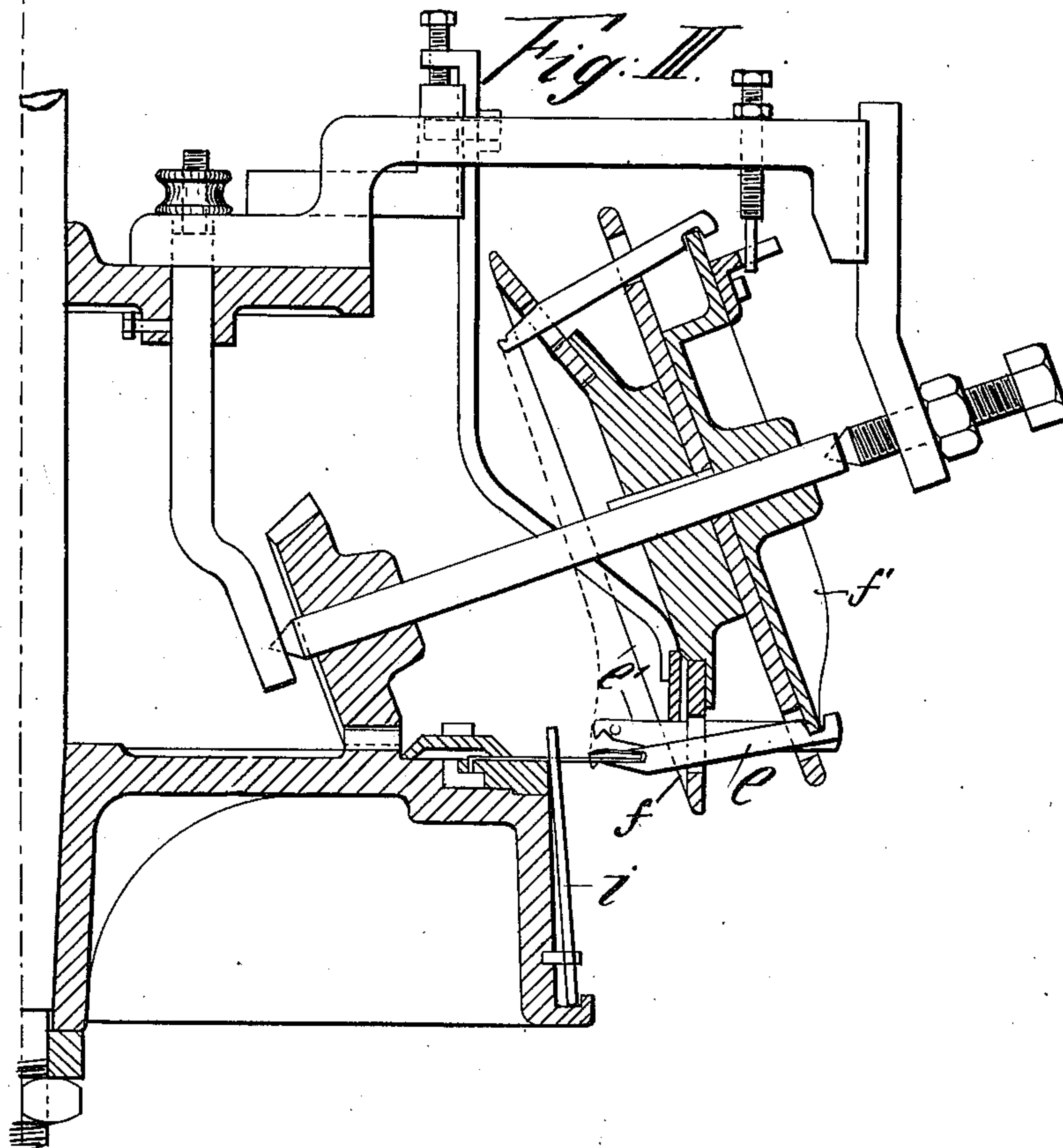
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## CIRCULAR KNITTING MACHINE FOR TUCK STITCH GOODS.

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(No Model.)

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## CIRCULAR KNITTING MACHINE FOR TUCK STITCH GOODS.

No. 547,684.

Patented Oct. 8, 1895.

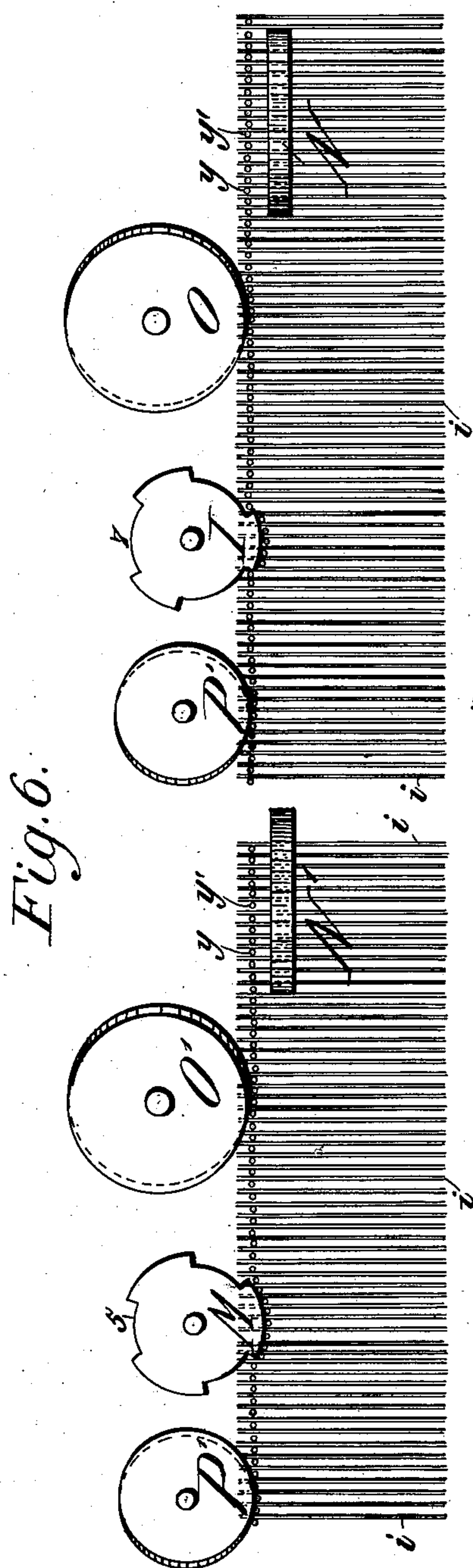


Fig. 6.

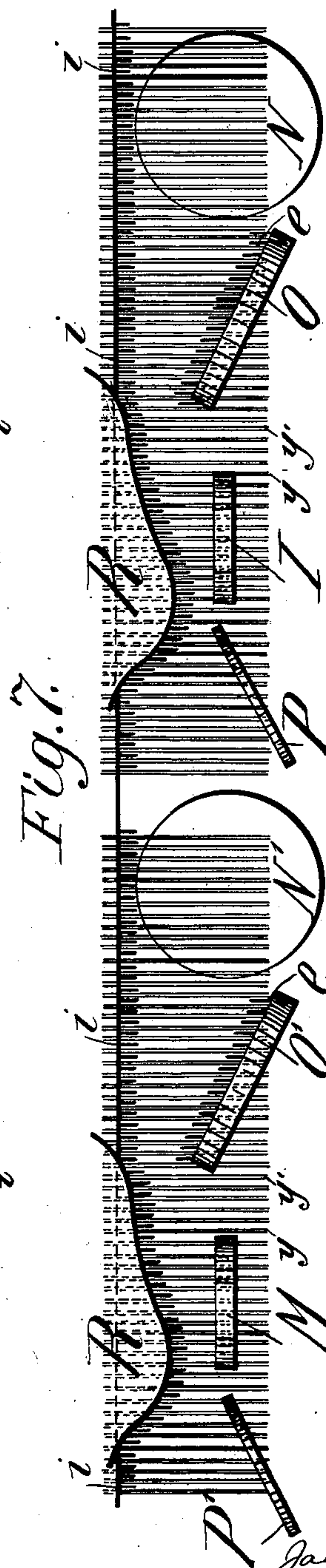


Fig. 7.

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# UNITED STATES PATENT OFFICE.

JACQUES SCHIESSER, OF RADOLFZELL, GERMANY.

## CIRCULAR-KNITTING MACHINE FOR TUCK-STITCH GOODS.

SPECIFICATION forming part of Letters Patent No. 547,684, dated October 8, 1895.

Application filed August 15, 1893. Serial No. 483,222. (No model.) Patented in Germany September 25, 1892, No. 73,374; in France October 6, 1892, No. 224,754; in Sweden October 10, 1892, No. 4,362; in Belgium October 12, 1892, No. 101,716; in Spain October 17, 1892, No. 13,848; in Italy October 22, 1892, No. 32,892/335; in England October 31, 1892, No. 19,553; in Switzerland December 15, 1892, No. 5,358, and in Austria-Hungary April 29, 1893, Nos. 50,658 and 90,594 and Nos. 1,284 and 1,216.

*To all whom it may concern:*

Be it known that I, JACQUES SCHIESSER, a citizen of Switzerland, residing at Radolfzell, in the Grand Duchy of Baden, German Empire, have invented new and useful Improvements in Circular-Knitting Machines for Tuck-Stitch Goods, (for which I have obtained Letters Patent in Germany, No. 73,374, dated September 25, 1892; in England, No. 19,553, dated October 31, 1892; in Italy, No. 32,892/335, dated October 22, 1892; in Austria-Hungary, Nos. 50,658 and 90,594 and Nos. 1,284 and 1,216, dated April 29, 1893; in France, No. 224,754, dated October 6, 1892; in Belgium, No. 101,716, dated October 12, 1892; in Spain, No. 13,848, dated October 17, 1892; in Sweden, No. 4,362, dated October 10, 1892, and in Switzerland, No. 5,358, dated December 15, 1892,) of which the following is a specification.

This invention relates to apparatus for the manufacture of colored tuck-stitched goods in circular frames by means of tuck-wheels, and more particularly refers to such fabrics as present longitudinal or diagonal stripes or stripes intersecting so as to form squares, triangles, and other designs of any suitable size, while their backs or wrong sides are smooth.

A feature of the fabric produced by means of the improved apparatus forming the subject of this invention is that the threads at the back are tied to the front stitches in a peculiar manner, instead of being loose, and are not visible on the right or front side of the fabric.

In the ordinary method of manufacturing colored or striped goods in apparatus having tuck-stitch wheels the thread which serves to form one of the colored stripes is loosely passed on the wrong side of the fabric over the proper stripe of a different color. In other words, it does not participate in the knitting and extends loosely as far as the next stripe of the same color. This method, however, has been found to be attended by various drawbacks in practice, especially where the thread in question has to extend across comparatively-wide spaces equivalent to, say,

seven, nine, fifteen, or more stitches, the consequence being that such knitted goods have only been employed hitherto to a very limited extent, since after being worn for some time, and particularly after being frequently washed, the fabric becomes "felted" and the loose threads become weak and fragile. When they break, as the connection of the various stripes of the same color is only maintained by these loose threads, rips or holes are formed in the fabric. Knitted fabric thus produced cannot be regarded as strong and durable, in addition to which the appearance of threads arranged in this manner is not pleasant, the meshes or stitches forming the borders at the ends of the stripes being irregularly set and not so close together as the other stitches, so that patches of loose fabric become visible, which not only destroy the regularity of the design, but also give the impression of the fabric not being quite smooth.

Now in the fabric produced according to my present invention the drawbacks just mentioned are avoided, the thread forming one of the colored stripes being, instead of lying loosely at the back of the fabric, tied up with and taken up in the knitting of the right front stitch without, however, exercising any influence on this stitch itself, since it is not visible through the stripe. This method makes the fabric considerably stronger and better capable of resisting friction, and protects the thread from felting and breaking. Another advantage is that as the threads in question are tied up with the fabric the material becomes thicker and more substantial than if the said threads, as hitherto, form loose loops at the back or on wrong side of the knitted fabric, since they are now embodied in the knitting itself, so that a stronger and more durable material is produced.

In the accompanying drawings, Figure 1 shows diagrammatically the knitting of the threads in a fabric as usually manufactured with loose back threads. Fig. 2 is a corresponding view of a piece of fabric according to this invention. Fig. 3 is a part section of the stitch-forming portion of a knitting-machine arranged according to this invention.



Figs. 4 and 5 are views to a larger scale, illustrating the combined action of the needles and sinkers. Figs. 6 and 7 are diagrammatic views representing the arrangement of two series of needles and other parts arranged in the same frame, but illustrated as being in a straight line (for clearness) instead of in the arc of a circle.

In manufacturing knitted fabrics according to this invention the thread *a*, Fig. 1, which, as stated, was hitherto allowed to hang loosely on the back of the fabric and was not knitted or woven up with it, (see the back of the fabric as shown in Fig. 1,) and which in circular frames extends at times over the whole series of "untucked" needles, is located and looped, as shown in Fig. 2, in such a manner that before the formation of the next row of stitches is commenced it takes up its position in the needles similarly to the lining-thread used in one-to-one chain-knitting in readiness to be knitted up together with the threads already lying on those needles. The fabric may, as shown in the accompanying drawings, be formed in French circular frames with a rotary needle-ring, a stitch-forming device fitted with the necessary sinkers, and sinker-rods for operating the needles and thread to form stitches as required, and also with the required tuck-wheels, reducing-wheels, and inclosing wheels arranged in the ordinary manner. For each thread intended to form a given design a different system of stitch-forming is provided for, each stitch or loop former serving for one thread. Each stitch-former is provided with a series of two different types of sinkers. The sinkers *e*, as is well known, serve in circular frames to insert the thread to be knitted into the point (hook) of the needle, and they are adapted so to move between the needles that the front hook *g* of the sinker, as the stitch-former turns, in moving backward comes into contact with the thread, and thus brings the thread *a*, lying in the front hook *g*, into the said needle-hook. The remaining sinkers are all adapted to move similarly to the first, with the general result that the needle-ring and the sinkers situated at a certain angle to each other move in the same direction, (similarly to what they do in the so-called "Stuttgart" stitch-former,) so that in each of the needle-points (hooks) they place a thread to be subsequently taken up by the knitting. To form these threads into loops in the knitting, the needle-hooks are pressed down and the stitches carried by the needles, or, in other words, the portion of fabric that is ready is moved toward the needle-hooks, so that these stitches pass over the needle-hooks, and as they descend along the head of the needle remain suspended on the threads (now formed into meshes or stitches) which the sinkers *e* have placed in the needle-hooks. When, however, instead of pressing down the points of all the needles uniformly and without exception, a certain number of them is peri-

odically left out—say seven—which may be effected by means of tuck-wheels recessed for the purpose at the corresponding parts, there will be formed at that part a loose thread (see *xx* in Fig. 1) as the fabric is drawn into the needle-hooks of the seven needles which have not been tucked. To avoid the formation of this loose thread, or so to distribute it in the needle-hooks that its position is similar to the lining-thread in one-to-one chain-knitting, there is provided, according to the present invention, either on the left or on the right side of the front hook *g* of every other sinker *e'* of the stitch-former, corresponding to the unpressed or untucked needles, a small pin *h*, which, as the sinkers descend between the needles, meets and presses upon the needle-points, and thus, instead of inserting the thread into the needle-hook, causes it to slide past these hooks as far as the needle-head, when, by means of the stripping-wheel, the thread is stripped off and carried over the needle. As the material is drawn in again the thread will be so distributed in the various needles that it has exactly the same appearance as the lining-thread in a one-to-one chain-stitch-knitting frame. When, therefore, the next row of stitches is commenced, this thread may be taken up in the knitting. It should be borne in mind in this connection that the sinkers corresponding to the untucked or unpressed needles *y y'* should not all be provided with pins, but only, say, every other sinker.

Figs. 4 and 5 illustrate the method of operation of a sinker of this construction with one thread *a* only. One sinker *e'* is provided with a pin *h*, while the next sinker *e* carries no pin. Fig. 5 shows how the sinker *e'*, carrying the pin *h*, having passed the thread over the needle-hook *y'*, tends to throw it off, while the sinker *e*, unprovided with a pin, has just drawn the thread into the needle-hook *y*, where it is retained. All that has been said with reference to one stitch-former is also applicable to the second or third, and so on, whatever their number, except that each of them will have to work in a special thread of a different color.

Supposing it is desired to produce knitted fabric in which a red stripe five stitches wide alternates with a black stripe seven stitches wide, the width of the whole design thus being twelve stitches, the first stitch-former *O*, which has to work in the red thread *A*, requires two series of sinkers, one series of five ordinary sinkers for knitting the thread *A* in the usual manner and another series of seven sinkers, of which the first, third, fifth, and seventh (or the second, fourth, and sixth) are provided each with a small pin *h*. The tuck-wheel or presser-wheel *I*, appertaining to this first stitch-former, acts upon the first five needles and leaves the seven following needles unpressed, owing to the recess *7*, provided in the corresponding part of the tuck-wheel. Then the next following five needles are again



pressed down, and so on. The second stitch-former  $O'$ , which supplies the black thread  $B$ , causes this thread to be worked in by the seven needles which have not been pressed  
 5 by the first tuck-wheel. This latter stitch-former has seven ordinary sinkers and a second series of five sinkers, of which the first, third, and fifth (or the second and fourth) carry small pins. The corresponding tuck-  
 10 wheel  $M$  presses the series of seven needles, but not the adjoining series of five needles, owing to the recesses 5.

Figs. 6 and 7 represent the arrangement of two series of needles and other parts arranged  
 15 in the same frame in a straight line, for the sake of clearness, instead of in the arc of a circle.  $NN'$  are the inclosing wheels;  $OO'$ , the stitch-formers, each of which works one of the threads forming the design.  $TM$  are the tuck-wheels.  $PP'$  are the stripping-wheels.  $i$  are sinker-rods.  $e$  are stitch-forming sinkers;  $R R$ , sinker-wedges. Each colored stripe requires one group or series of these  
 20 devices. The process is applicable to threads of all kinds and colors and to any desired combination of such threads, and it may also be employed in cases where a lining is knitted together with the main or upper fabric.

In Fig. 3 I have shown a portion of a well-known form of circular-knitting machine, by  
 30 which, in connection with my improved devices before described, the fabric shown in Fig. 2 may be produced. Referring to said figure,  $e e'$  indicate the sinkers. These sinkers, of which about three hundred work at

times, are held by a mesher  $f$ , which consists of the plates attached to the same axle and having as many incisions as there are sinkers working together. The sinkers are inserted in these incisions in the usual manner, and  
 40 the front hook  $g$  of each sinker during the rotation of the mesher falls at times between the needles, and on further rotation of the mesher the sinkers are moved rearwardly by a cam-plate  $f'$ , mounted on the same shaft as  
 45 the mesher and engaging notches in the ends of the sinkers, as shown. The sinkers  $e$  in their backward movement cause the thread to engage the needle-hooks, while the pins  $h$  of the sinkers  $e$  press their corresponding hooks  
 50 and permit the thread to slip over the same.

What I claim is—

In a circular knitting machine, the combination with the hooked needles and rotary tuck wheels, of a rotary stitch former carrying a series of hooked sinkers adapted to engage the thread, each alternate sinker of each  
 55 alternate set  $e, e'$ , being provided with a lateral pin  $h$  adapted to press and close the point of the corresponding needle hooks and permit  
 60 the thread to slip over such hooks, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JACQUES SCHIESSER.

Witnesses:

Mrs. A. H. LOWRIE,  
 ADOLF FREY.