

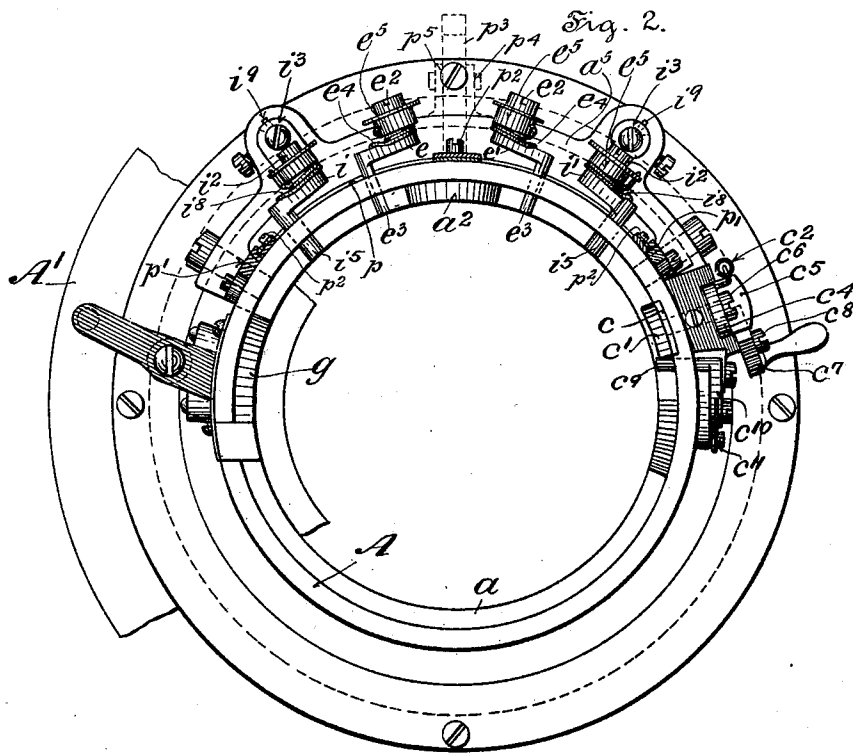
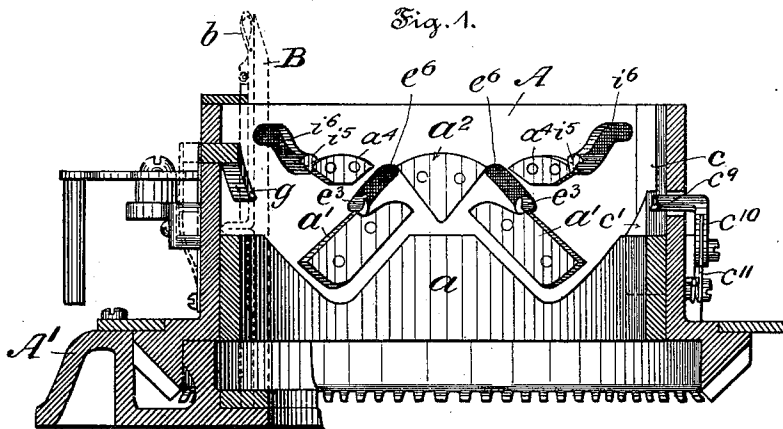
(No Model.)

2 Sheets—Sheet 1.

H. PARKER, Jr., E. SCANLIN, H. H. SKEVINGTON
& W. L. WHITEHEAD.
KNITTING MACHINE.

No. 592,883.

Patented Nov. 2. 1897.



Witnesses:
A. D. Horn,
Nebel & Faust.

Inventors:
Harry Parker Jr.,
Edward Scanlin,
Henry D. Skevington
William L. Whitehead
By Lemuel Boman
att'y.

(No Model.)

2 Sheets—Sheet 2.

H. PARKER, Jr., E. SCANLIN, H. H. SKEVINGTON
& W. L. WHITEHEAD.
KNITTING MACHINE.

No. 592,883.

Patented Nov. 2, 1897.

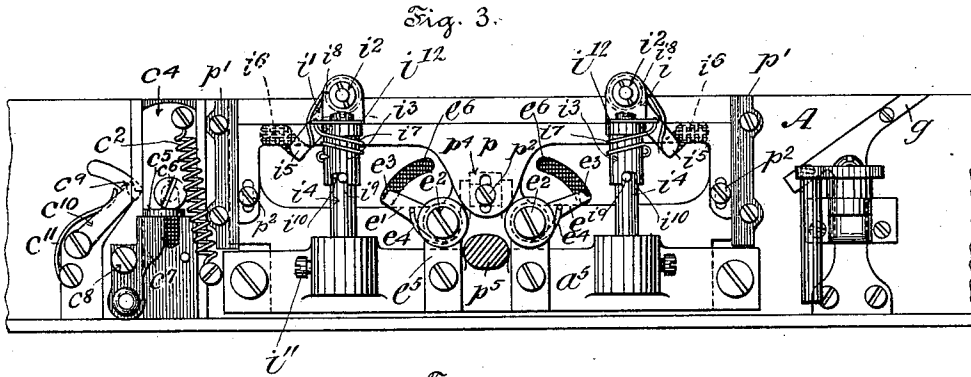


Fig. 4.

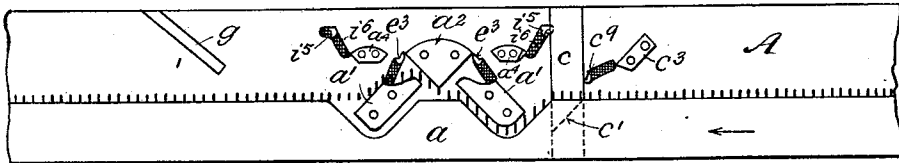


Fig. 5.

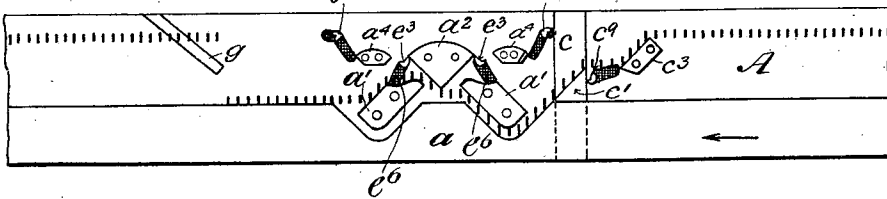


Fig. 6.

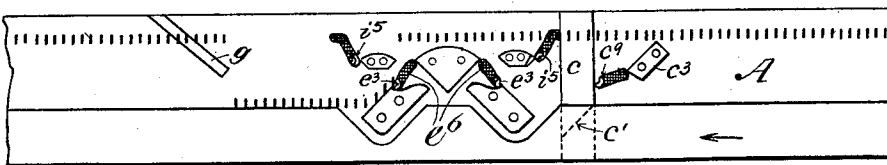
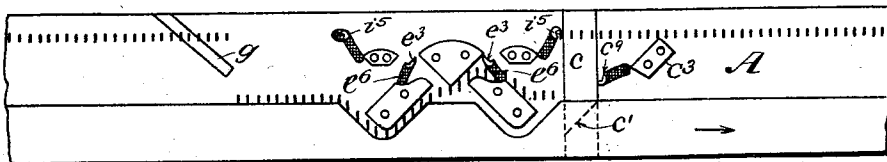


Fig. 7.



Witnesses:

A. D. Horn.
Mabel W. Faust.

Inventors:

Danny Parker Jr.,
Edward Scanlin,
Henry D. Skevington &
William L. Whitehead.

By Herman Bornmann
Att'y.

UNITED STATES PATENT OFFICE.

HARRY PARKER, JR., EDWARD SCANLIN, HENRY H. SKEVINGTON, AND
WILLIAM L. WHITEHEAD, OF PHILADELPHIA, PENNSYLVANIA.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 592,883, dated November 2, 1897.

Application filed February 16, 1897. Serial No. 623,756. (No model.)

To all whom it may concern:

Be it known that we, HARRY PARKER, JR., EDWARD SCANLIN, HENRY H. SKEVINGTON, and WILLIAM L. WHITEHEAD, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Knitting-Machines, of which the following is a specification.

Our present invention relates to circular-knitting machines, and more particularly to devices for throwing in and out of action certain needles by which the toe and heel of stockings may be formed.

The invention consists of a cam-shaped slide in connection with a picker for raising a number of needles in succession.

It further consists of pickers for automatically throwing a needle on each side of the working needles out of action to decrease gradually the width of the web.

It further consists of pickers for automatically throwing a needle on each side of the working needles into action to increase gradually the width of the web; and it further consists of a device for rendering either or both of such pickers inactive, as hereinafter more fully described, and pointed out in the claims.

The invention will be more fully understood taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a vertical central section of a cam-cylinder of a circular-knitting machine embodying our invention. Fig. 2 is a plan view of the cam-cylinder with our improvements shown in place. Fig. 3 is an outside view of the cam-cylinder developed. Figs. 4 to 7, inclusive, are diagrammatic views showing the various ways of manipulating the needles by our improved devices to form, for instance, the toes and heels of stockings.

Referring now to the drawings for a further description of our invention, A is a cam-cylinder of usual construction mounted on the bed A' of a cylindrical knitting-machine and driven by suitable gearing in the usual or any preferred manner.

B in Fig. 1 is the needle-cylinder, and b the needles.

a is a cam secured to the cam-cylinder A. a' are stitch-cams located on each side of a triangular cam a², all of which are adapted to engage the hubs of the needles b to actuate the same.

In forming a heel or toe of a stocking a number, generally one-half, of the needles are first thrown out of action, and of the remaining active needles there is at each half-revolution of the cam-cylinder the outer needle thrown out of action until the web is reduced to a certain width, after which the web is again increased in width by throwing into action singly and successively the needles at each half-revolution of the cam-cylinder and at each side of the active needles until one half of the entire number of needles is again in action, after which the other half of the inactive needles are thrown into active position, as will be readily understood by those skilled in the art to which this invention pertains.

The devices for performing the first-named operation—that of throwing one-half of the entire number of needles out of action—consists of a vertical slide c, having a cam-shaped projection c', which, when raised, as shown in Figs. 1, 3, and 5, against the action of the spring c², causes the hubs of the needles b coming in contact with the projection c' to be elevated and transferred onto the side cam c³, Figs. 4 to 7, which when rotated with the cam-cylinder A brings the needle-hubs entirely out of reach of any cams. This slide c is made of two parts, the cam portion c' and the outside portion c⁴, which latter is provided with a projection c⁵. These two portions are secured together by a screw c⁶, passing through a slot in the cam-cylinder A, and each is guided in ways, as shown in Fig. 2. The slide c is raised into active position against the spring c² and set by means of the trip c⁷, hinged at c⁸ to the cam-cylinder A, when the latter is in a certain position with the needle-cylinder B, so that a certain and predetermined number (generally one-half) of the needles may be raised out of action by turning the cam-cylinder A in the direction indicated by the arrow in Fig. 5. The needle-hubs are in this way transferred onto and over the side cams c³ and out of reach of the needle-

operating cams a , a' , and a^2 . Before the last of the number of needles to be rendered inactive leaves the cam-shaped projection c' of the slide c the trip c' is tilted and the spring c^2 draws the slide downward. If now the cam-cylinder A is rotated farther in the same direction, the needle-hub which rested on the highest part of the cam portion c' engages the side cam c^3 , and the notched end c^9 of the lever c^{10} abuts against the needle-hub next to the last highest needle and carries it onto the side cam c^3 , while the other needle-hubs remain in position to be actuated by the cams a , a' , and a^2 .

The lever c^{10} is hinged at the outside of the cam-cylinder A , and its notched end c^9 , protruding a slot in the cylinder A , is normally held depressed by the spring c^{11} , so as to be in position to engage the needle-hub located near or on the top of the cam projection c' in order that when the cam-cylinder A , with the lever c^{10} , is rotated the resistance offered by the needle-hub causes the lever c^{10} to move about its pivot and carry the needle-hub onto the side cam c^3 , after which the spring c^{11} returns the notched end c^9 of the lever c^{10} to its normal position, in which the active needle-hubs are permitted to pass under the same—*i. e.*, between the end c^9 and the cam a .

The second operation, or that of narrowing the web after half the number of needles have been thrown out of action, is to reduce the number of needles in action, first by rendering one needle inactive on one side of the active needles and then on the other, as will be fully understood by those skilled in the art. Our device for this purpose consists of two levers e e' , each hinged at e^2 to a projection e^5 of a semiannular bracket a^5 , secured to the outside of the cam-cylinder A . The levers e e' are right angular in shape and have one of their legs hinged to the projection e^5 , while the other leg e^3 extends through slots e^6 into the cam-cylinder, so that the notched free ends e^3 of the levers are or can be brought into engagement with the needle-hubs. Springs e^4 are attached with one end to the respective projection e^5 , so that the notched ends e^3 are always kept in operative position to elevate or transfer the needle-hub coming first in contact with the same from the stitch-cam a' onto the top cam a^2 , Fig. 6—*i. e.*, out of action—when the cam-cylinder A is reciprocated. Provision, however, is made to keep the lever ends e^3 out of operative position, as will be hereinafter described. As soon as the elevated needle-hub leaves the notched end e^3 of the respective levers e e' the spring e^4 forces the same downward and the end e^3 rides over the hubs of the needles in action, so as not to disturb the rest of the needles in operation. After the web has been sufficiently narrowed the levers e and e' are raised by suitable means, so that their ends e^3 do not engage with any hubs of the needles still in active position. Those means may con-

sist of a sliding shield or plate mounted on the outside of the cam-cylinder A , as will be hereinafter more fully described.

The narrowing of the web being accomplished in the manner described, the next step in forming the heel or toe pouch is to widen the web, and this is done in the usual manner by drawing into action again one needle on one side of the active needles and then another needle on the other side. The devices for accomplishing this result are two right-angular levers i and i' , adapted to oscillate in two directions for a purpose to be described. One leg of each of these levers i i' is hinged at i^2 to a bracket, while the other leg with its free and notched end i^5 protrudes slots i^6 in the cam-cylinder A . Each bracket with sleeve i^3 is mounted on a stem i^4 , adjustably secured by means of the set-screw i^{11} to the semiannular bracket a^5 , so that the free end i^5 of the lever i or i' may be set accurately. A spring i^8 is employed for each lever i and i' to keep their free ends i^5 in elevated position. One end of each spring i^8 is attached to the bracket of the sleeve i^3 and the other end to the under side of the lever i and i' .

On each stem i^4 is secured a pin i^9 , which registers with a slot or notch i^{10} of each sleeve i^3 in order to allow each lever i and i' a certain swing about its stem i^4 , so that the free ends i^5 may be pushed flush with the inside of the cam-cylinder wall to avoid the needle-hubs. Such swinging motion of the levers i and i' is made against the tension of the springs i^7 , which are held with one end to a washer i^{12} , stationary with the stem i^4 , and with the other end to the sleeve i^3 , for a purpose to be described.

If a needle b is to be brought from inactive to active position, Fig. 7, the free and notched end i^5 by the reciprocation of the cam-cylinder is brought into contact with the hub thereof and carried downward beneath or onto the cams a^1 , so that the same may be again engaged by the cams a^2 , a' , and a . After such needle-hub has been released from the free end i^5 the latter is thrown back and under the remaining inactive needle-hubs, under which it rides. The end i^5 of the other lever i or i' , not coming into action, simply turns outward—*i. e.*, the lever i or i' , with its oscillating sleeve i^3 , turns about its stem i^4 and runs over the ends of the hubs, the end i^5 of such lever being not depressed. To prevent the ends i^5 from flapping out of the groove i^6 at such action, the stop-pin i^9 is secured to the stem i^4 , and the notch i^{10} is provided in the sleeve-studs i^3 , as shown in Figs. 2 and 3 and as before described.

After the web has been sufficiently widened by drawing into action again all the necessary needles in the manner as above described and it is desired to take the rest of the needles into the stitch-forming cams a , a' , and a^2 , the inclined plate g , as heretofore employed, is

pushed into the cam-cylinder A to bring the hubs of the needles *b* downward into the cams *a*, *a'*, and *a*².

When knitting tubular webs—*i. e.*, when all the needles are in action—the notched ends *e*³ of the angular levers *e* and *e'* must be out of the way of the needle-hubs, and this is accomplished by the plate *p*, held in suitable guides *p'* onto the cam-cylinder A. In Fig. 3 this plate *p* is shown in its lower position, so that the notched ends *e*³ of the picker-levers *e* and *e'* are in operative position, as shown in Fig. 6, and the notched ends *i*³ of the picker-levers *i* and *i'* are in inoperative position. The plate *p* is preferably made in two pieces held together by the screws *p*², entering slots in one plate, so that the openings formed by the two pieces are either increased or diminished in order to properly adjust the picker ends *e*³ and *i*³.

The shifting of the plate *p* upward for causing the throwing into action of certain needles or downward for causing the throwing out of action of needles may be accomplished by suitable means—for instance, a lever *p*³ is hinged at *p*⁴ to a lug *p*⁵ of the cam-cylinder A.

Having thus described the nature and objects of our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a knitting-machine, the combination of a needle-cylinder, needles and a cam-cylinder, of a vertical slide having a cam-shaped projection extending into the cam-cylinder and adapted to raise needles out of action, a spring tending to hold the slide in depressed position, a transfer-cam *c*³ and a lever *p*³ adapted to lift a needle with which it comes into contact onto the transfer-cam, substantially as and for the purposes set forth.

2. In a knitting-machine, the combination of a needle-cylinder, needles, and a cam-cylinder, of a vertical slide having a cam-shaped projection extending into the cam-cylinder when raised to render needles out of action, a trip pivoted to the outside of the cam-cylinder to hold the said slide in operative position, a spring tending to depress the said slide and cam-shaped projection, a transfer-cam *c*³, and a lever *c*¹⁰ adapted to lift a needle with which it comes into contact onto the transfer-cam, substantially as and for the purposes set forth.

3. In a knitting-machine, the combination

of a needle-cylinder, needles, and a cam-cylinder having stitch-forming cams *a*, *a'*, *a*² and side cams *a*⁴, of levers *i*, *i'*, sleeves *i*³, stems *i*⁴, said levers having their free ends extending into the cam-cylinder, springs acting on said sleeves and adapted to hold the free ends of the levers inside the cam-cylinder, and springs tending to force the free ends of the levers upward, substantially as and for the purposes set forth.

4. In a knitting-machine, the combination of a needle-cylinder, needles, and a cam-cylinder having stitch-forming cams *a*, *a'*, *a*² and side cams *a*⁴, of levers *i*, *i'*, sleeves *i*³, stems *i*⁴, said levers having their free ends extending into the cam-cylinder, springs acting on said sleeves adapted to hold the free ends of the levers inside the cam-cylinder, springs tending to force the free ends of the levers upward and a plate slidingly mounted on the outside of the cam-cylinder and adapted to hold the free ends of the levers *i*, *i'* depressed, substantially as and for the purposes set forth.

5. In a knitting-machine, the combination of a needle-cylinder, needles, and a cam-cylinder having stitch-forming cams *a*, *a'*, *a*² and side cams *a*⁴, of levers *i*, *i'*, sleeves *i*³, adjustable stems *i*⁴, said levers having their free ends extending into the cam-cylinder, springs acting on said sleeves adapted to hold the free ends of the levers inside the cam-cylinder, springs tending to force the free ends of the said levers upward, of levers *e*, *e'* hinged on brackets attached to the outside of the cam-cylinder, said levers *e*, *e'* having their free ends extending into the cam-cylinder, a spring on each of said levers adapted to hold the same in depressed position and means for holding the levers *i* and *i'* out of operation and levers *e* and *e'* in operation, said means comprising an adjustable plate *p* held in guides attached to the outside of the cam-cylinder, substantially as and for the purposes set forth.

In witness whereof we have hereunto set our signatures in the presence of two subscribing witnesses.

HARRY PARKER, JR.
EDWARD SCANLIN.
HENRY H. SKEVINGTON.
WILLIAM L. WHITEHEAD.

Witnesses:

HERMANN BORMANN,
G. PERCY FOX.