(No Model.) 3 Sheets—Sheet 1.

J. W. PIKE.

CIRCULAR KNITTING MACHINE.

No. 423,080. Patented Mar. 11, 1890.

Fig. 1.

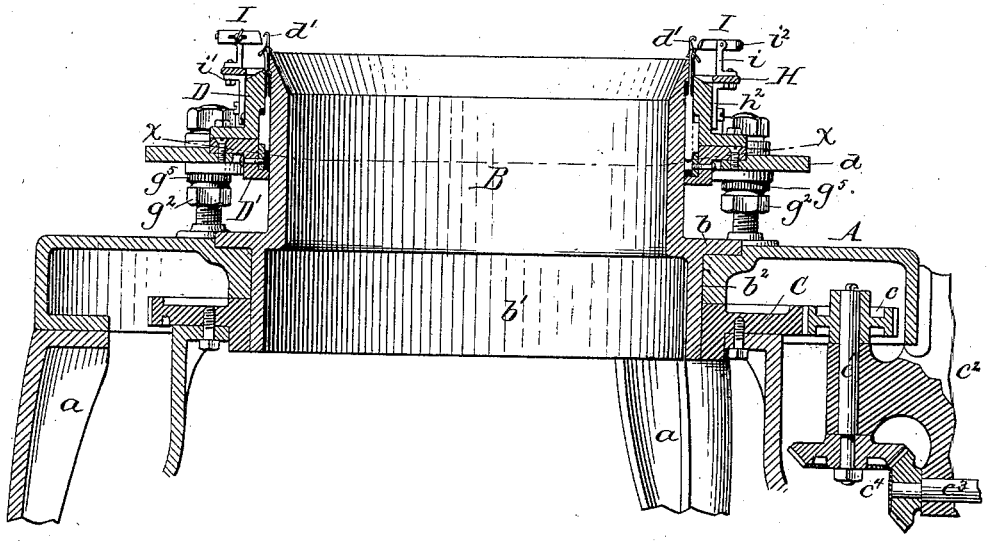
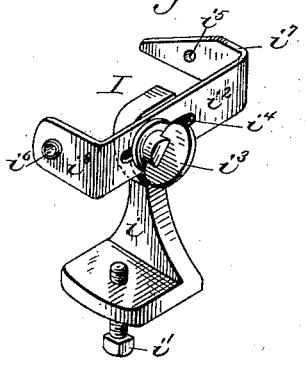


Fig. 8.



Witnesses:
Chas. J. Buchheit.
Theo. L. Popp.

James W. Pike Inventor.
By Wilhelm Bonnet
Attorneys.

(No Model.) 3 Sheets—Sheet 2.

J. W. PIKE.

CIRCULAR KNITTING MACHINE.

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Fig. 2.

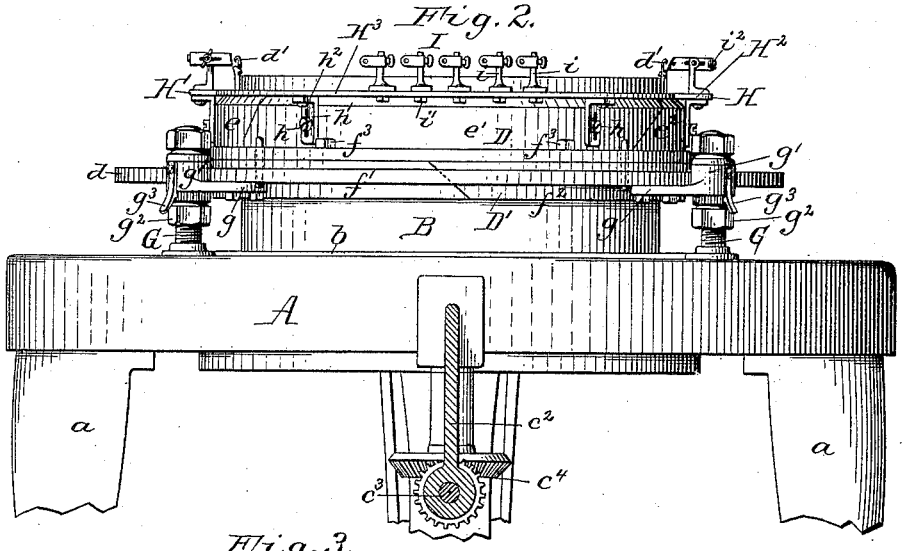
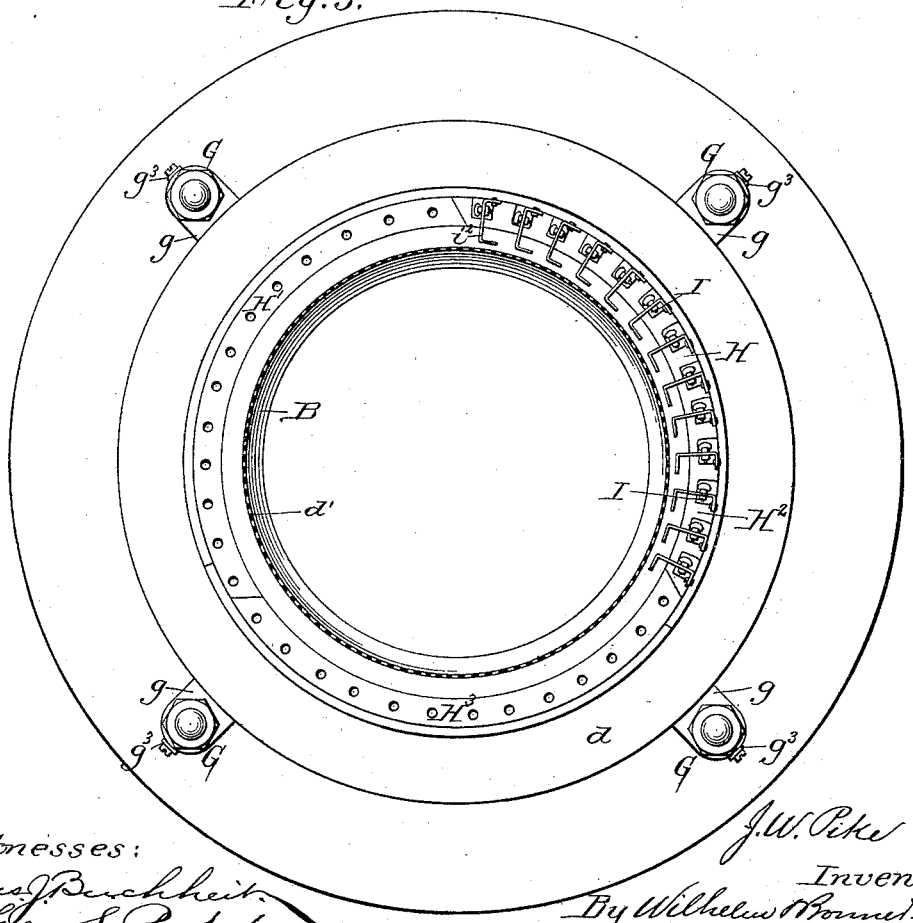


Fig. 3.



Witnesses:
Chas. J. Burchheit
Thos. L. Popp

J. W. Pike
Inventor
By Wilhelm Bonnet
Attorneys

(No Model.) 3 Sheets—Sheet 3.

J. W. PIKE.

CIRCULAR KNITTING MACHINE.

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Fig. 4.

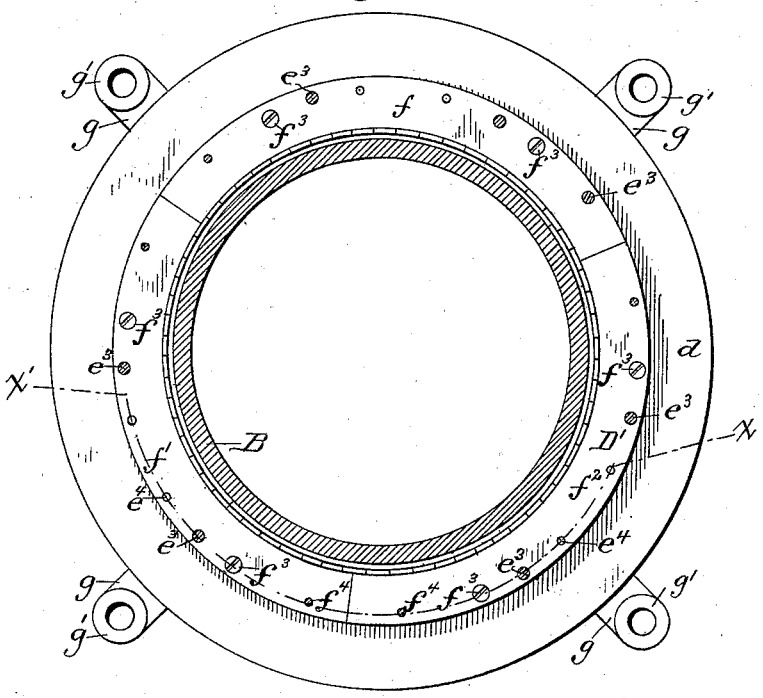


Fig. 5.

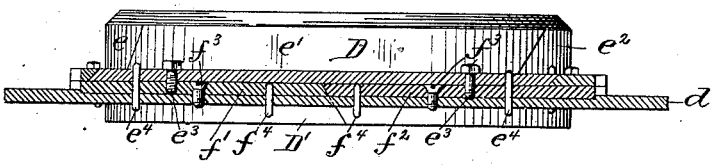


Fig. 6.

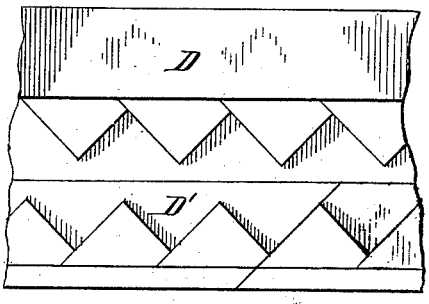
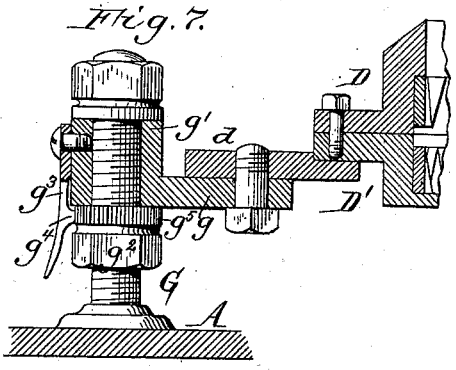


Fig. 7.



Witnesses:
Chas. J. Buchheit.
Theo. L. Popp.

James W. Pike Inventor.
By Wilhelm & Bonner
Attorneys.

UNITED STATES PATENT OFFICE.

JAMES W. PIKE, OF LITTLE FALLS, NEW YORK.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 423,080, dated March 11, 1890.

Application filed August 13, 1888. Serial No. 282,530. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. PIKE, of Little Falls, in the county of Herkimer and State of New York, have invented new and useful Improvements in Circular-Knitting Machines, of which the following is a specification.

My invention relates to that class of knitting-machines which are provided with a revolving needle-cylinder, and in which the fabric is knit in the form of a circular web or tube.

The object of my invention is to improve the construction of the cam-rings which actuate the needles, whereby the cam-rings can be readily attached and detached, and also to provide simple means whereby the cam-rings can be readily adjusted; also to improve the construction of the thread-guides.

The invention consists of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of three sheets, Figure 1 is a vertical sectional elevation of the upper portion of a knitting-machine provided with my improvements. Fig. 2 is a fragmentary front elevation thereof. Fig. 3 is a top plan view of the machine. Fig. 4 is a horizontal section in line $x\ x$, Fig. 1. Fig. 5 is a vertical section of the cam-rings and their support in line $x'\ x'$, Fig. 4. Fig. 6 is a fragmentary inside elevation of the cam-rings on an enlarged scale. Fig. 7 is a sectional elevation of one of the adjustable standards whereby the cam-rings are supported. Fig. 8 is a perspective view of one of the thread-guides.

Like letters of reference refer to like parts in the several figures.

A represents the top or table portion of the machine supported upon legs a.

B represents the revolving needle-cylinder supported upon the table A by an annular flange b and provided at its lower end with a downwardly-projecting sleeve b', arranged in an opening b^2, formed centrally in the table A.

C represents an external gear-rim secured to the lower end of the sleeve b' of the cylinder B, and c represents a gear-pinion meshing with the gear-rim C and secured to the upper end of a vertical shaft c', which is journaled in a bearing c^2, secured to the table A. Motion is transmitted to the pinion c and needle-cylinder B from a driving-shaft c^3 by bevel-wheels c^4 in the usual manner.

The cam-cylinder which surrounds the needle-cylinder B is composed of a lower ring D′, which is supported upon an annular frame d, and an upper ring D, which is bolted or secured to the lower ring. The rings D D′ are each provided on their inner surface with cams arranged opposite each other and forming a cam-race for the needles, the upper edge of the cam-race being formed by the cams on the upper ring D and the lower edge of the cam-race by the cams on the lower ring D′.

d' represents the needles arranged between the cylinder B and the cam-cylinder and which are actuated by the latter in the usual manner.

The cam-rings D D′ are each composed preferably of three sections $e\ e'\ e^2$ and $f\ f'\ f^2$, respectively, but a greater number of sections may be employed, if desired. The sections $f\ f'\ f^2$ of the lower ring D′ are secured to the annular frame d by screws f^3 and dowel-pins f^4, and the sections $e\ e'\ e^2$ of the upper cam-ring D overlap and break joint with the sections of the lower cam-ring and are secured to the latter by screws e^3 and dowel-pins e^4. The meeting edges of these sections are cut obliquely, so as to cause the edges to overlap each other, and thereby prevent the needle-jacks from working into these joints and cause the parts to bind or break.

By constructing the cam-cylinder in sections the operator is enabled to readily replace a broken cam or a needle-jack or to substitute tuck for plain cams by simply removing one or more of the sections of one or both of the cam-rings, as may be required, without removing or raising the entire cam-cylinder.

G represents posts or standards, upon which the annular frame d is supported by arms g, having sleeves g', which fit snugly over the posts G, and which can be adjusted vertically thereon by nuts g^2, applied to the threaded portion of the standards. The posts G are secured with their lower ends to the table A. Each sleeve g' is provided with a depending flat spring g^3, secured to the sleeve g', and having a tooth g^4, which engages in a notched rim g^5, formed on the nut g^2. The springs g^3

serve as gages when the nuts g^2 are turned for adjusting the cam-rings, and also lock the nuts g^2 after the parts are adjusted. This construction permits of a very fine and uniform vertical adjustment of the frame d on all of its supports without gaging or calipering the parts from the table to the frame d, as heretofore practiced. The same vertical adjustment is readily effected on each post by turning each nut to the extent of the same number of notches.

H represents an annular frame which supports the thread-guides and encircles the upper portion of the needle-cylinder B, and which is composed, preferably, of three sections H′ H² H³. The sections H′ H² H³ are secured to the upper cam-ring D by screws h, passing through vertically-elongated openings h', formed in brackets h^2, so as to be vertically adjustable. Two of the brackets h^2 are preferably secured to each section of the supporting-frame H, and each section of the frame H is secured by these brackets to a corresponding section of the upper cam-ring D, so that it can be removed with the same.

Each section of the supporting-frame H is provided with a series or group of thread-guides I, which encircle the upper ends of the needles d'. Fig. 3 of the drawings shows the group of these guides attached to the section H², while those of the sections H′ H³ are omitted.

As clearly shown in Fig. 8 of the drawings, each thread-guide I consists of a standard i, secured to the supporting-frame H by a vertical screw-bolt i', and a radial guide-plate i^2, secured to the upper end of the standard i by a thumb-screw i^3, passing through an elongated opening i^4, formed in the guide-plate i^2. i^5 i^6 represent openings formed in the arms i^7 i^8 of the guide-plate i^2, and through which the thread passes to the needles. It will thus be seen that all of the thread-guides I, arranged upon one of the sections of the supporting-frame H, can be simultaneously adjusted by means of the brackets h^2, thereby facilitating the uniform adjustment of the guides. The inner arm i^7 of each guide-plate i^2 can be adjusted vertically and radially toward and from the needles d' by means of the thumb-screw i^3 and slot i^4, as well as laterally by swinging the standard on its screw-bolt i'. By this construction a great saving of time is effected in adjusting the thread-guides, as it is not necessary to bend or twist the guides, as in the case with guides formed in one piece.

I claim as my invention—

1. The combination, with the needle-cylinder and a supporting-frame surrounding said cylinder, of a cam-cylinder composed of a lower cam-ring secured to said supporting-frame and composed of a number of detachable sections, and an upper cam-ring, also composed of a number of detachable sections and secured to the lower cam-ring, each ring being provided on its inner surface with separate cams forming a cam-race for the needles, substantially as set forth.

2. The combination, with the needle-cylinder, of a ring divided transversely into segmental sections and each of said sections supported independently of the others, and thread-guides attached to said ring-sections, substantially as set forth.

3. The combination, with the needle-cylinder and a cam-ring surrounding the same, of an annular frame surrounding the needle-cylinder, means whereby said frame is made vertically adjustable on said cam-ring, and thread-guides secured to said annular frame, substantially as set forth.

4. The combination, with the needle-cylinder and a cam-ring surrounding the same, of an annular frame surrounding said needle-cylinder and composed of a number of independent sections, means whereby each of said sections is made separately adjustable on said cam-ring, and thread-guides secured to each section, substantially as set forth.

5. The combination, with the needle-cylinder, an annular frame surrounding said cylinder and composed of a number of sections, and thread-guides secured to said sections, of a cam-ring also surrounding said cylinder and composed of a similar number of sections, each of which cam-sections carries one of the sections of said supporting-frame, substantially as set forth.

6. The combination, with the needle-cylinder and the annular supporting-frame H, composed of several independent sections, of brackets h^2, secured to the frame H and provided with vertically-elongated openings, a cam-ring D, composed of a similar number of sections, and screws h, whereby the brackets h^2 are adjustably secured to the sections of the cam-ring, substantially as set forth.

7. The combination, with a needle-cylinder and a thread-guide-supporting frame, of a standard i, pivoted to the supporting-frame by a vertical screw-bolt, and a radial guide-plate i^2, having thread-openings and adjustably secured to said standard by a thumb-screw i^3 and slot i^4, substantially as set forth.

Witness my hand this 7th day of August, 1888.

JAMES W. PIKE.

Witnesses:
J. W. SHERMAN,
JOHN ROACH.