(No Model.) 4 Sheets—Sheet 1.

J. W. PIKE.

TAKE-UP MECHANISM FOR CIRCULAR KNITTING MACHINES.

No. 423,079. Patented Mar. 11, 1890.

Fig. 1.

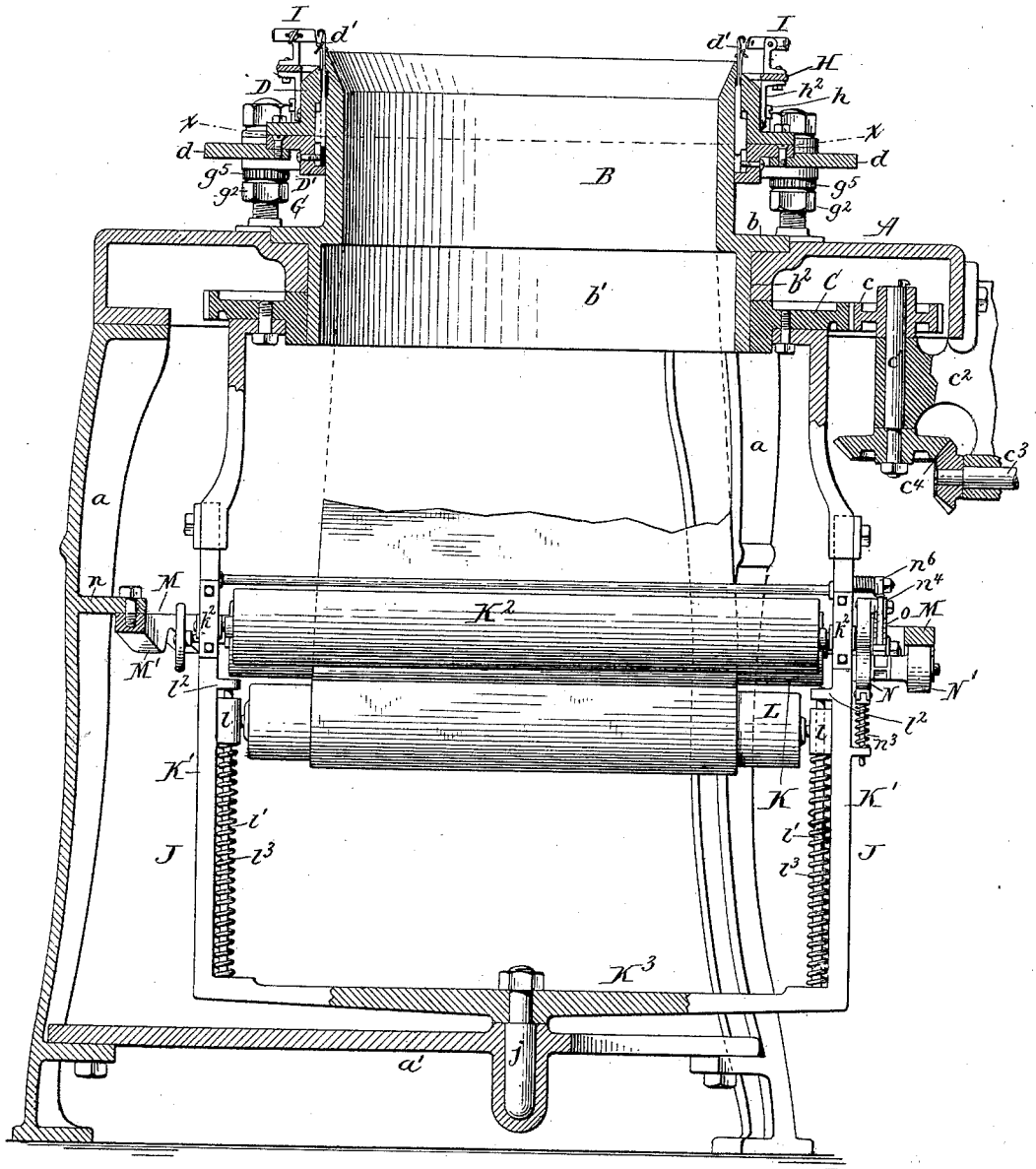

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Fig. 2.

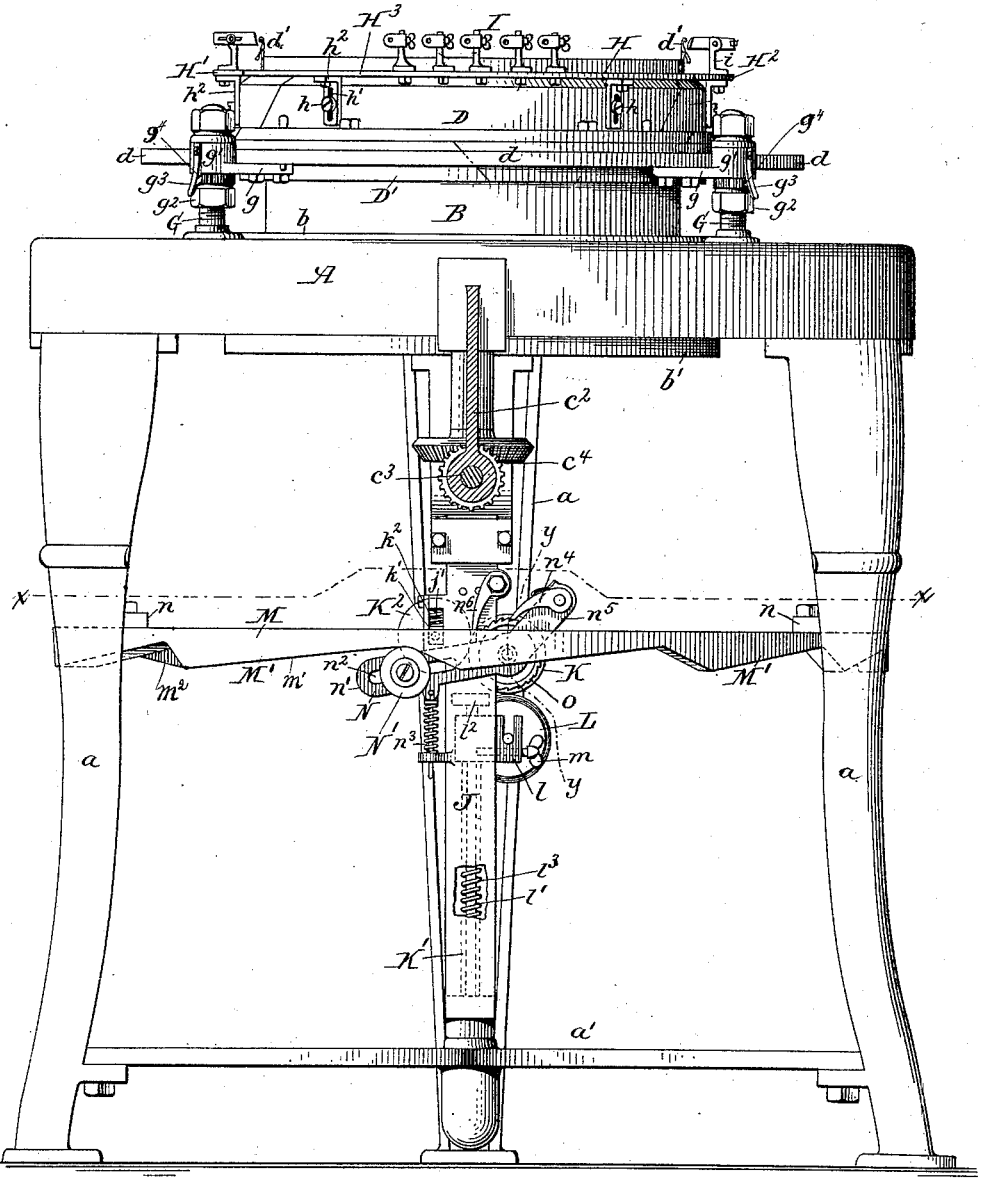

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Fig. 3.

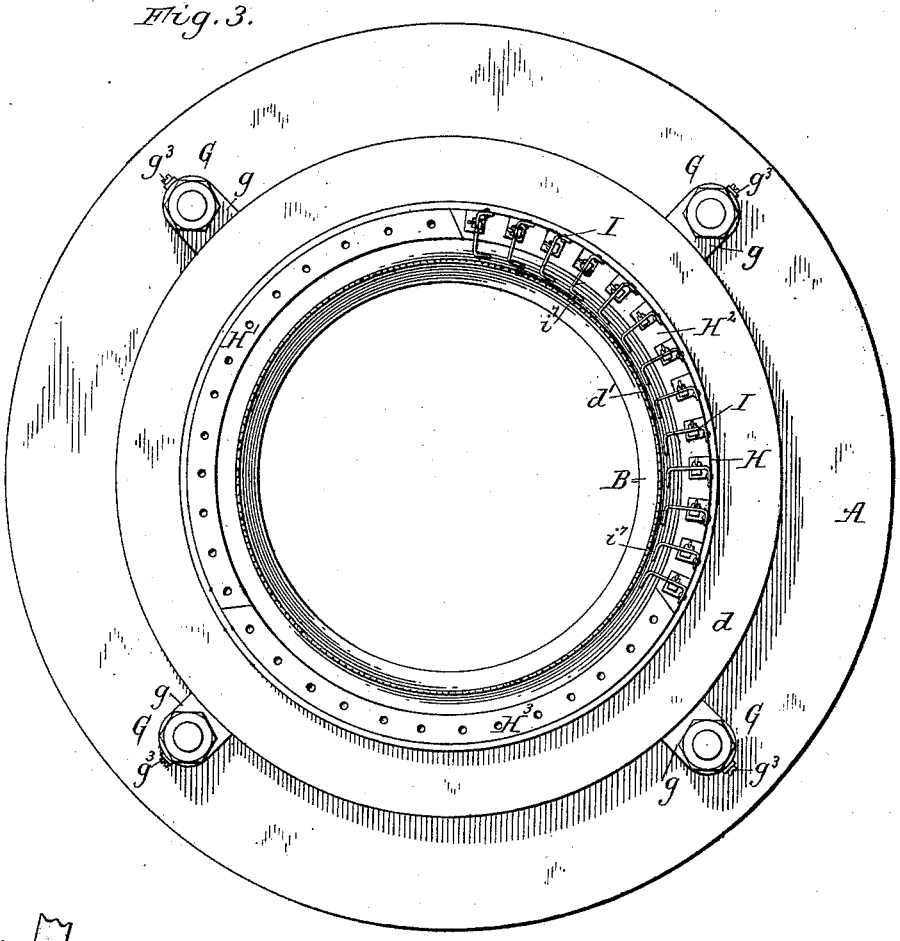

Fig. 4.

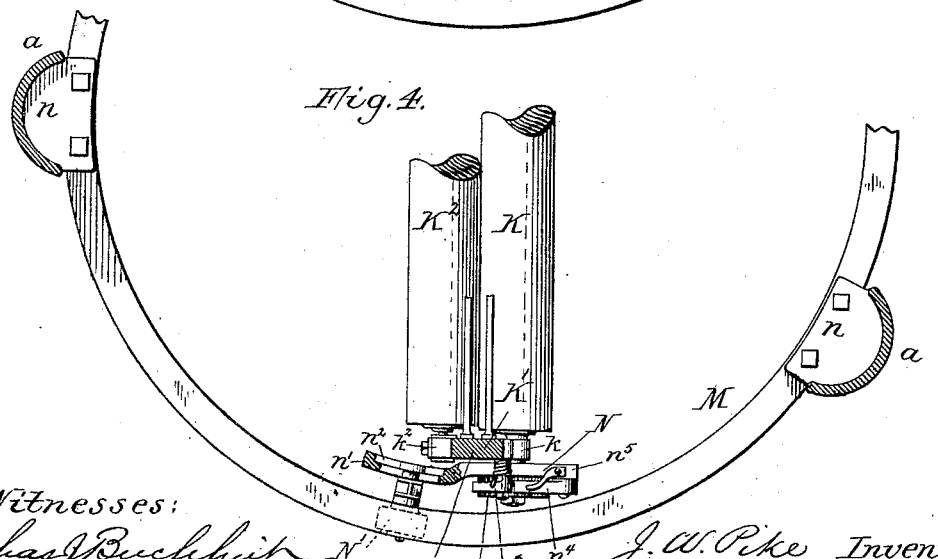

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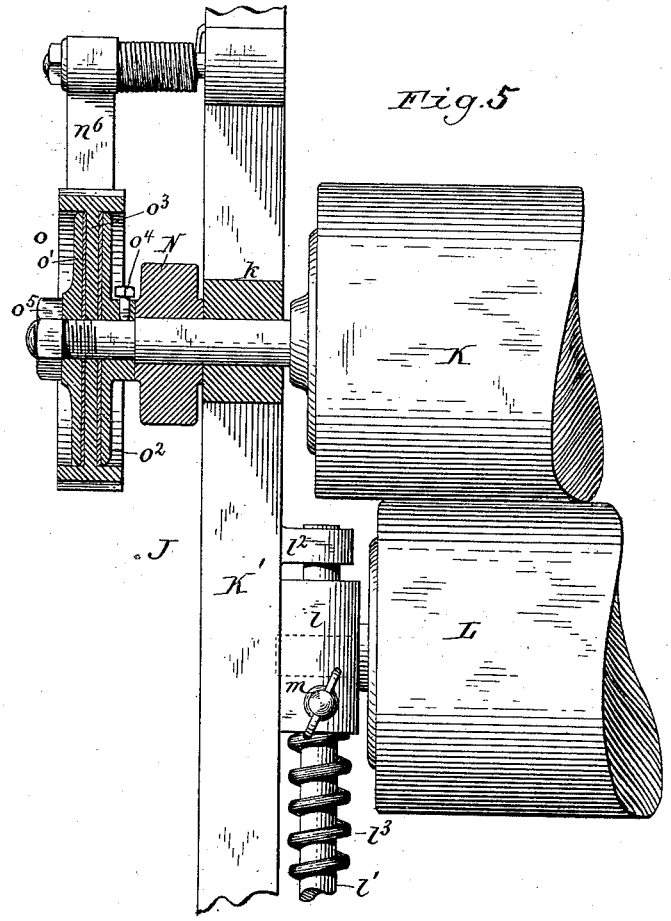
Fig. 5



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UNITED STATES PATENT OFFICE.

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

TAKE-UP MECHANISM FOR CIRCULAR-KNITTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 423,079, dated March 11, 1890.

Application filed April 17, 1888. Serial No. 270,990. (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 Take-Up Mechanism for 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, and which are provided with a mechanism for automatically taking up the knit fabric.

The object of my invention is to provide a simple and inexpensive mechanism whereby the knit fabric is taken up in a regular and uniform manner.

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

In the accompanying drawings, consisting of four sheets, Figure 1 is a vertical sectional elevation of a knitting-machine provided with my improvements. Fig. 2 is a front elevation, and Fig. 3 is a top plan view, of the same. Fig. 4 is a fragmentary horizontal section in line $x\ x$, Fig. 2. Fig. 5 is a fragmentary section in line $y\ y$, Fig. 2, on an enlarged scale.

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, which latter are connected at their lower ends by a bridge-piece 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 at 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.

D represents the upper cam-ring, and D' the lower cam-ring, both of which surround the needle-cylinder B and are supported upon an annular frame or ring d.

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

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.

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' H^2 H^3. The sections H' H^2 H^3 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 a group of these guides attached to the section H^2, while those of the sections H' H^3 are omitted.

J represents a vertical U-shaped take-up frame pivoted axially below the needle-cylinder B to the bridge-piece or step a' by a vertical pin j, and secured at its upper ends to the under side of the gear-rim C, so as to be rotated thereby.

K represents the feed-roller, mounted in bearings k formed on one side of the vertical arms K' of the take-up frame J, and K^2 represents the gripping-roller arranged in front of and slightly above the feed-roller K, and journaled in bearing-boxes k' moving in vertical

ways k^2 formed on the opposite side of the vertical arms K′ of the take-up frame.

j' represents spiral springs arranged in the ways k^2 and bearing on the boxes k', whereby the roller K^2 is pressed downwardly and toward the feed-roller K and caused to tightly grip the fabric between itself and the feed-roller.

L represents the take-up roller, mounted in bearings $l\,l$, moving on vertical rods or guides $l'\,l'$ arranged on the inner sides of the vertical arms K′ of the take-up frame. The rods $l'\,l'$ pass through openings formed on the inner enlarged ends of the bearings $l\,l$, and are secured at their lower ends to the horizontal cross-piece K^3 of the take-up frame, and at their upper ends to lugs or ears l^2 formed on the vertical arms K′ above the bearings $l\,l$.

l^3 l^3 represent spiral springs surrounding the guide-rods $l'\,l'$, and arranged between the cross-piece K^3 of the take-up frame and the under side of the bearings $l\,l$, and which serve to hold the take-up roller L against the feed-roller K, so as to be rotated by the latter and take up the finished fabric. As the body of the fabric on the take-up roller L increases in size it causes the roller and the springs l^3 to be depressed, and thereby gradually increases the tension of the springs. This increasing tension is sufficient to overcome the increasing weight of the take-up roller, so that the latter is held in constant contact with the feed-roller K during the process of winding.

m represents horizontal set-screws arranged in the bearings $l\,l$, and adapted to engage against the guide-rods $l'\,l'$ and secure the bearings $l\,l$ on these rods. When it is desired to remove a filled roller from the machine, the latter is stopped only long enough to permit the roller and the bearings to be moved downwardly away from the feed-roller K and to be secured in this position by clamping the bearings $l\,l$ on the rods $l'\,l'$ by the set-screws m. The fabric is then cut and the filled roller lifted out of the open upper ends of the bearings $l\,l$ and a new roller substituted, when the bearings $l\,l$ are released and the new roller is moved upward against the feed-roller K by the springs l^3. The pressure of the gripping-roller K^2 against the feed-roller K is sufficient to hold the fabric with the proper tension between them and the needle-cylinder B when the cloth fabric has been cut, thereby preventing the fabric from bagging or becoming loose and obviating irregular knitting when the operation of knitting is resumed, as would be the case if the tension were applied to the fabric directly from the take-up roller. This construction effects a great saving of time in replacing a new for a filled roller.

M represents a horizontal ring secured to lugs n on the legs a, and surrounding the take-up frame J opposite the feed-roller K, and provided on its lower side with an annular row of cams M′.

N represents an elbow-lever mounted on the shaft of the feed-roller K between one of the vertical arms K′ of the take-up frame and the cam-ring M, and provided on its long arm n' with a roller N′, which engages against the cams M′, as represented in Figs. 1, 2, and 4. The cam-roller N′ is adjustably secured in an elongated opening n^2 formed in the long arm n' of the elbow-lever N, and is held in engagement with the cam-ring by a suitable spring n^3. The movement of the lever N can be increased or diminished to regulate the feed, as the work may require, by adjusting the roller in the opening n^2.

n^4 represents a feed-pawl secured to the short arm n^5 of the elbow-lever N, and which engages with a ratchet-wheel o mounted on the shaft of the feed-roller K.

n^6 represents a detent-pawl secured to the vertical arm K′ of the take-up frame adjacent to the ratchet-wheel o, and which prevents retrograde movement of the latter.

As shown in Fig. 5 of the drawings, the ratchet-wheel o is mounted loosely on the shaft of the feed-roller K between two friction-disks o' o^2, which bear against opposite sides of the web o^3 of the ratchet-wheel. The disk o^2, arranged on the inner side of the ratchet-wheel, is secured to the shaft of the feed-roller K by a set-screw o^4, and the disk o', arranged on the outer side of the wheel, is forced against the latter by a screw-nut o^5, arranged on the threaded end of the shaft of the feed-roller K. The disk o' is forced against the wheel by this nut with sufficient pressure to cause the ratchet-wheel o to turn with the disks and to rotate the take-up roller when the tension on the fabric is normal, but allows the ratchet-wheel to slip between these disks without turning the take-up roller when the tension on the fabric becomes excessive, in which case the operation of winding ceases until the normal tension is restored.

Each cam M′ is composed of a long feeding-face m', of slight inclination and a short abrupt back m^2, which latter permits the elbow-lever to effect its backward movement very quickly, so that the movements of the elbow-lever consist of a quick backward movement by which the lever is placed in position for feeding and a comparatively long feeding movement. By this means an almost continuous feeding action of the roller is produced, effecting a practically-uniform tension on the fabric and resulting in a fabric of uniform mesh.

I do not wish to claim in this application any features in the construction of the needle-cylinder and cam-rings for actuating the needles, or any other features herein shown and described and not specifically claimed, as such features form the subject of a separate application filed by me August 13, 1888, Serial No. 282,530.

I claim as my invention—

1. The combination, with the rotating take-up frame J, the feed-roller K, and the take-up roller L, of the gripping-roller mounted in

movable bearings, said bearings being supported in ways and being capable of movement toward and from the feed-roller, and springs whereby the gripping-roller is pressed against the feed-roller, substantially as set forth.

2. The combination, with the rotating take-up frame J and a stationary cam-ring M, surrounding said take-up frame, of a feed-roller K, supported in the take-up frame and provided with a ratchet-wheel, an elbow-lever supported on the shaft of said feed-roller and provided at one end with a pawl engaging with the ratchet-wheel on the feed-roller, and at its opposite end with a roller engaging against the cam-ring M, a gripping-roller K^2, mounted in vertically-movable bearings, springs whereby the gripping-roller is pressed against the feed-roller, a take-up roller L, mounted in vertically-movable bearings arranged below the feed-roller, and springs whereby the take-up roller is held against the feed-roller, substantially as set forth.

3. The combination, with the take-up frame J and the feed-roller K, journaled on said frame, of a take-up roller L, bearings *l*, supported on vertical rods *l'*, arranged on the frame J and carrying the take-up roller, and springs l^3, surrounding said rods and bearing upwardly against the bearings *l*, whereby the take-up roller is pressed against the feed-roller, substantially as set forth.

4. The combination, with the rotating take-up frame J, provided with guide-rods *l'*, and the feed-roller K, journaled in said frame, of the take-up roller L, bearings *l*, carrying the take-up roller and sliding on the guide-rods *l'*, and springs l^3, surrounding said guide-rods and supporting the bearings *l* of the take-up roller, substantially as set forth.

5. The combination, with the rotating take-up frame J, provided with guide-rods *l'*, and the feed-roller K, journaled in said frame, of the take-up roller L, bearings *l*, carrying the take-up roller and sliding on said guide-rods, springs l^3, surrounding said guide-rods and supporting the bearings *l*, and a clamping device whereby said bearings can be secured on the guide-rods, substantially as set forth.

Witness my hand this 21st day of March, 1888.

JAMES W. PIKE.

Witnesses:
W. G. MILLIGAN,
J. W. SHERMAN,
JOHN ROACH.