(No Model.) 2 Sheets—Sheet 1.

F. A. CALLEY.

KNITTING MACHINE.

No. 249,000. Patented Nov. 1, 1881.

Fig: 1.

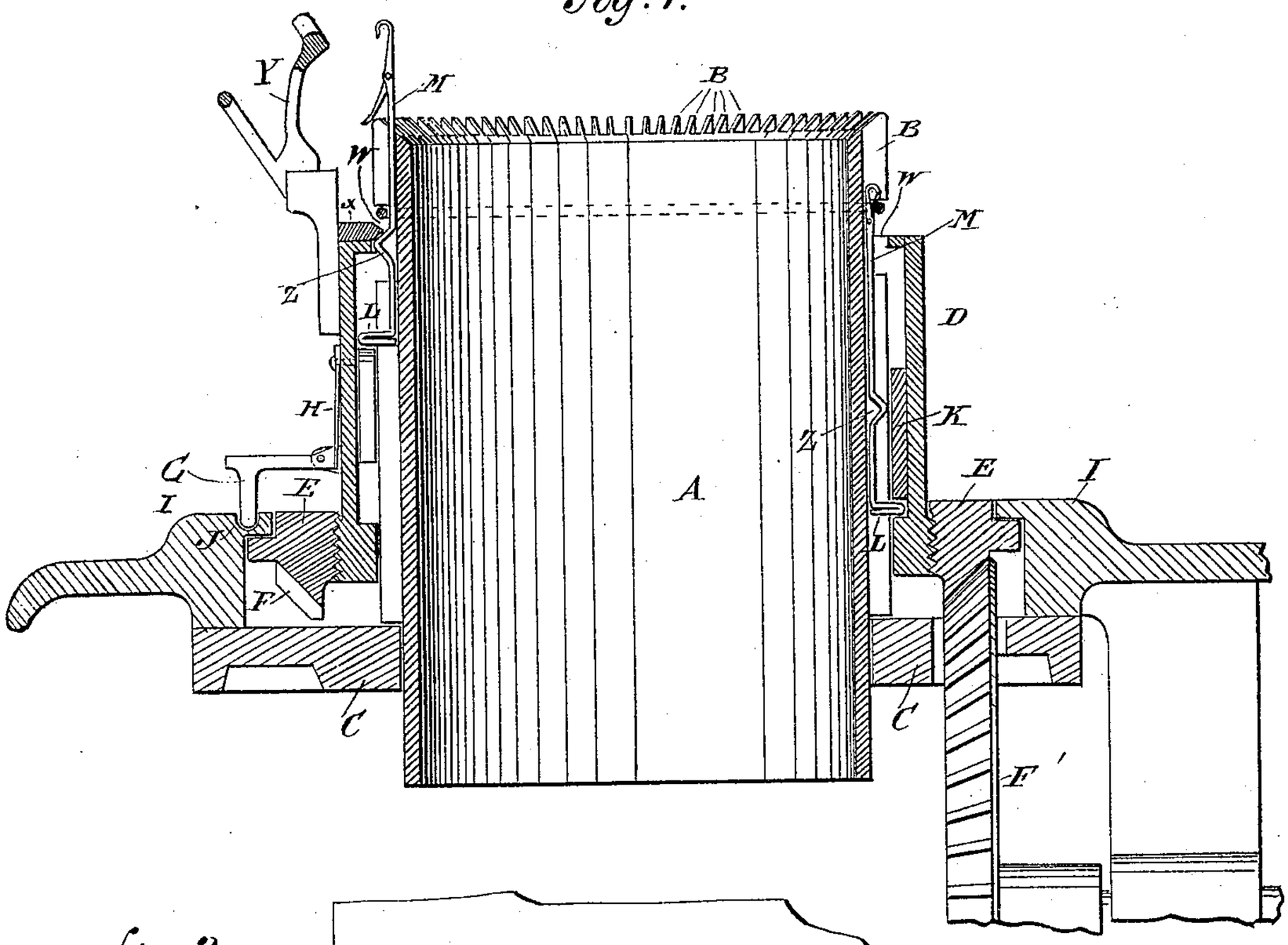
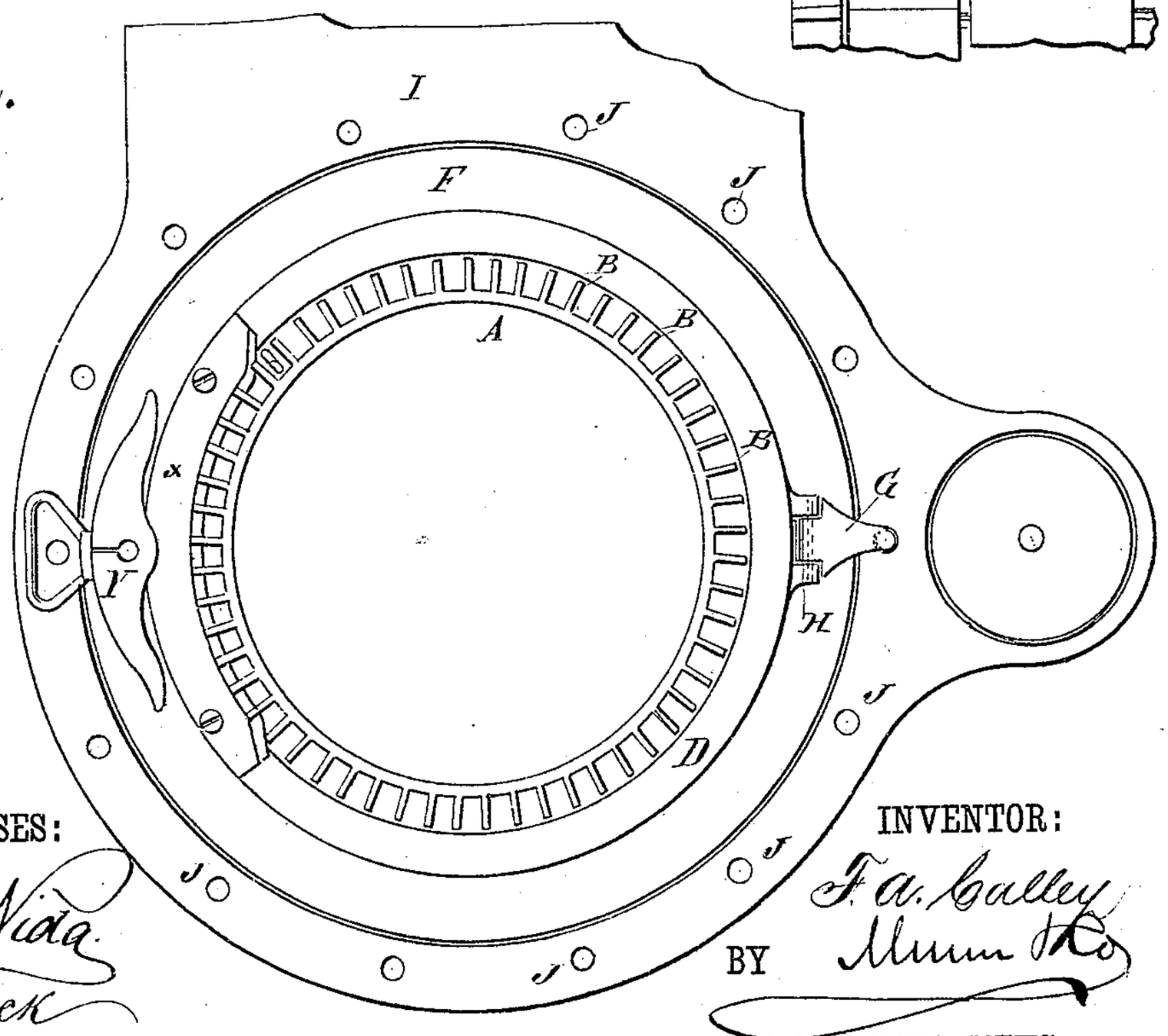


Fig: 2.



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(No Model.) 2 Sheets—Sheet 2.

F. A. CALLEY.

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Fig: 3.

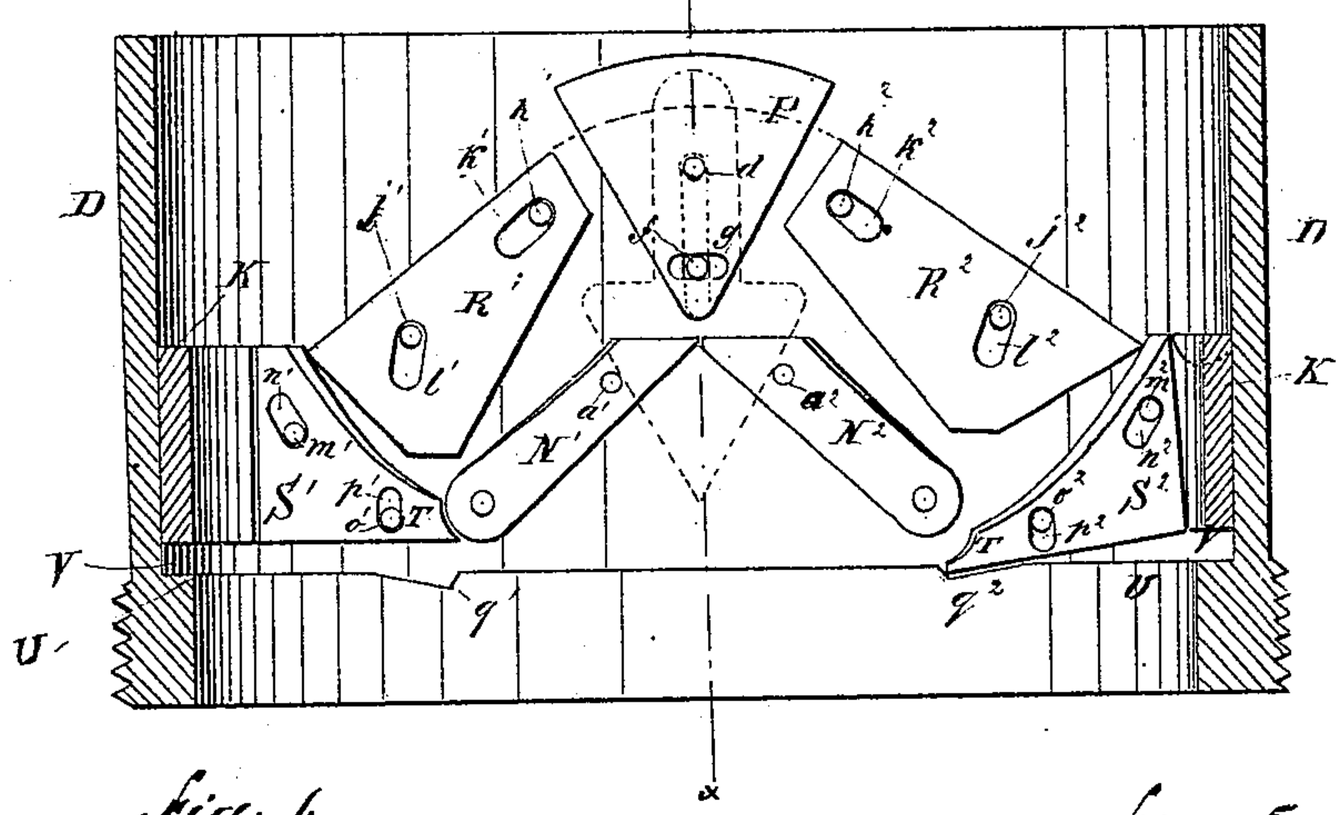


Fig: 4.

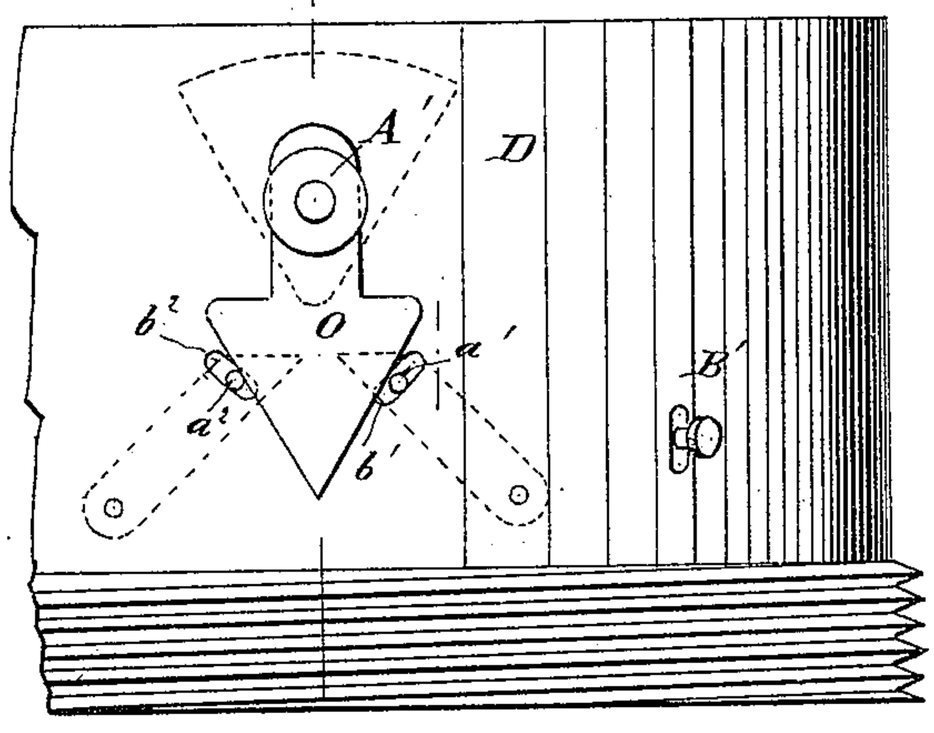
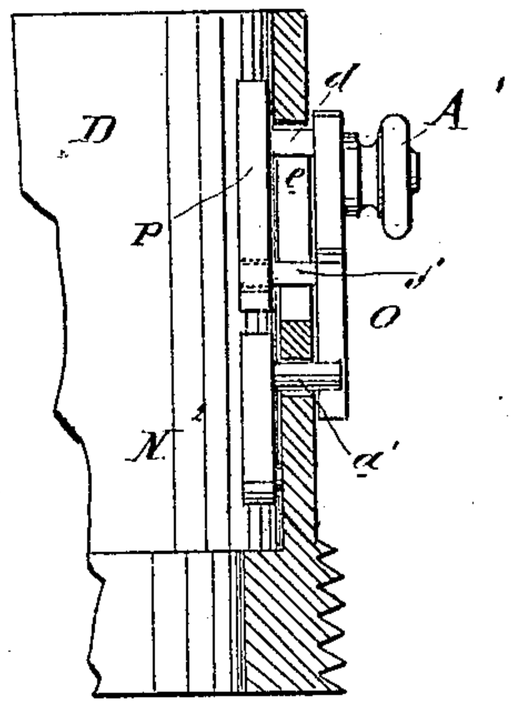


Fig: 5.



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UNITED STATES PATENT OFFICE.

FREEMAN A. CALLEY, OF NEW YORK, N. Y.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 249,000, dated November 1, 1881.

Application filed March 21, 1881. (No model.)

To all whom it may concern:

Be it known that I, FREEMAN A. CALLEY, of the city, county, and State of New York, have invented a new Improvement in Knitting-Machines, of which the following is a full, clear, and exact description.

The object of my invention is to facilitate the adjustment of the length of the stitch; to facilitate running a series of needles out of operation, and, finally, to prevent breaking the vertical ribs of the stationary needle-carrying cylinder.

In the accompanying drawings, Figure 1 is a cross-sectional elevation of a knitting-machine provided with my improvements. Fig. 2 is a plan view of the same. Fig. 3 is a cross-sectional elevation of the revolving or cam cylinder, showing the set of cams. Fig. 4 is an outside view of the same, showing the mechanism for adjusting the cams. Fig. 5 is a cross-sectional elevation of the same on the line *x x*, Fig. 4.

Similar letters of reference indicate corresponding parts.

A cylinder, A, provided with a series of radial external projections, B B, forming grooves for the needles, rests stationary on an annular base-plate, C, the lower edge of these projections B resting on the edge of the base-plate adjacent to the central aperture. A cam-cylinder, D, surrounds the needle-cylinder A and is provided at its lower end with an external screw-thread, which takes into the internal thread of a ring, E, which has bevel-gearing F on the under side engaging the teeth of the bevel gear-wheel F′, which is the driving-wheel of the machine.

An angular latch, G, or an equivalent device, is pivoted to the outer surface of the cam-cylinder D, near the bottom of the same, and is acted upon by a flat spring, H, which holds it in position when raised or lowered.

The annular plate I, which is flush with the top of the ring E, is provided with a series of apertures, J, into which the end or pin of the latch G fits, as shown in Fig. 1. An annular plate, K, is attached to the inner surface of the cam-cylinder D and forms a circular track upon which the foot L of each needle, M, rests. A part of this annular plate K is cut out to permit of arranging the cams for working the needles on the inner side of the revolving or cam cylinder D.

Two swinging-cams, $N' N^2$, are pivoted to the inner surface of cylinder D at their lower ends in such a manner that their upper ends will be in contact, and their upper beveled edges will be on a level with the top of the track K, as is shown in Fig. 3. Each of these cams $N' N^2$ is provided with a stud, a' and a^2, projecting through a slot, $b' b^2$, in the cylinder D, and resting against a vertically-sliding triangular or V-shaped guide-plate, O, on the outside of the cylinder D.

A V-shaped cam, P, on the inner side of the cam-cylinder D, is mounted on a stud, *d*, projecting from the inner surface of the slide O through a vertical slot, *e*, in the cylinder, and is also held by a stud, *f*, of the slide O passing through a horizontal slot, *g*, at or near the point of the cam P. Two wing-cams, $R' R^2$, are held to the inner side of the cam-cylinder D at each side of the V-shaped cam P by the studs $h' h^2$ passing through the longitudinal slots $k' k^2$, and by the studs $j j^2$ passing through the transverse slots $l' l^2$ respectively, whereby the wing-cams $R' R^2$ are held inclined from the top of the V-shaped cam P, and the lower ends of these wing-cams can be raised vertically a short distance to let the needles pass out.

Triangular cams S' and S^2 are held to the inner side of the cam-cylinder D, at the ends of the track-plate K by the studs $m' m^2$ passing through the upper inclined slots, $n' n^2$, and by the pins $o' o^2$ passing through the lower vertical slots, $p' p^2$, thus permitting the lower ends, T, of these triangular cams $S' S^2$ to be moved vertically a short distance. These lower ends, T, of these cams fit closely to the rounded lower ends of the cams $N' N^2$ when raised. The annular shoulder V at the bottom of the cam-cylinder D is provided with notches $q' q^2$ to receive the ends of the triangular cams S' and S^2. The lower edge of the track-plate K must be a short distance above the shoulder U, so that an annular groove, V, will be formed at the bottom of the inner surface of the cylinder D.

The cylinder A is provided with a broad groove, W, on the outside, near the upper end, and a segmental plate, *x*, with beveled ends

and inner edge is attached to the upper edge of the cam-cylinder D in such a manner that the beveled inner edge projects into the groove W. A thread-guide, Y, is rigidly attached to the cam-cylinder D.

The plate *x* is fastened to the cylinder D directly above the set of cams.

The operation is as follows: The latch G is ordinarily raised; but when the cam-cylinder D is to be raised or lowered (the needle-cylinder A always remaining stationary) for the purpose of adjusting the length of the stitch, the point of the latch G is passed into one of the apertures J and the crank is turned, rotating the gear-wheel F′ and the geared ring E. As the cylinder D is held by the latch G, and as the ring E is held in the base-plate and cannot move vertically, it is evident that the cylinder D must ascend or descend accordingly as the crank is turned. After the adjustment the latch G is raised and the cylinder D can be rotated. The length of the stitch can thus be adjusted in a very simple manner, and without any additional mechanism. It frequently happens that the foot L of a needle catches on one of the angles or corners of the cams and locks the needle-cylinder and the cam-cylinder together. If considerable power is applied the needle or the adjoining radial ridge B breaks off. To avoid this binding of the needles, I provide them with an outwardly-projecting crook or bend, Z, at or near the lower end. If a needle is not in the proper position the projection Z strikes the beveled edge of the plate *x*, and is either guided up or down and will slide over the top of this plate *x*, or will pass over the cams without binding. Assuming that the cam-cylinder revolves from right to left, a needle will be raised in the following manner: The foot L of the needle slides along the upper edge of the plate K, passes up along the upper edge of the wing-cam R′, passing down along the left edge of the V-shaped cam P, over the upper beveled edges of the cams N′ N², down the upper edge of the cam N², and up the curved inclined edge of the triangular cam S², (this cam being raised like the cam S′,) and the needle then slides along the upper edge of the plate K again.

If it is desired to make a mock rib alternate needles are to be used—that is, every second, third, fourth, &c., needle is used, the rest being run out to be out of operation. To run a needle out the slide O is slightly lowered, whereby the upper ends of the cams N′ N² are separated a short distance by the action of the inclined sides of the slide O on the studs *a′ a²*. The needles will not pass over the upper beveled edges of the cams N′ N², but will drop down into the annular groove. If the needles are to be raised again one of the cams S′ S² is lowered, as shown in Fig. 3, by means of a button or binding-screw, B′, projecting through the cylinder D, and the needles will slide up the incline of the same upon the top of the track-plate K.

If all the needles are to be run out above the cams onto the track-plate K, the V-shaped cam P is lowered until its upper edge is in the position indicated in dotted lines in Fig. 3. The needles will all run over the upper edges of the cams R′ P R² without operating. These needles are run up for the purpose of transferring tops on the needles, for the tops can only be transferred if all the needles are raised, so that the tops can be put on without picking them on. A "top" is a piece of web knit with a welt on a power-machine, and forms the ribbed top part of the stocking. These tops, which can be shorter or longer, are transferred on my machine, and the body of the stocking is then knit with my machine. If some needles were lowered the top would have to be put on needle by needle, and the machine would have to be turned, thus making the transferring of a top an inconvenient task, whereas in my machine it is very simple. As soon as the cam P is raised the needles will be lowered and raised by the cams in the ordinary manner.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a knitting-machine, the combination, with the stationary needle-carrying cylinder A, of the revolving cam-cylinder D, the beveled-geared ring E into which the cylinder D is screwed, the latch or equivalent G, the bevel-gear wheel F′, and the bed-plate I, substantially as herein shown and described, and for the purpose set forth.

2. In a knitting-machine, the combination, with the needle-carrying cylinder A, provided with an external groove, W, of a plate, *x*, provided with a beveled edge and ends, the cam-cylinder D, and needles M, provided with a beveled projection, Z, substantially as herein shown and described, and for the purpose set forth.

3. In a knitting-machine, a set of needle-operating cams, made substantially as herein shown and described, and consisting of a V-shaped cam, P, combined with two wing-cams, R′ R², the triangular cams S′ and S², and two pivoted cams, N′ N², inclined toward each other below the V-shaped cam P, as set forth.

4. In a knitting-machine, the combination, with the vertically-adjustable V-shaped cam P, the swinging wing-cams R′ R², and swinging or separable cams N′ N², provided with studs *a′ a²*, of the slide O with beveled sides, substantially as herein shown and described.

FREEMAN A. CALLEY.

Witnesses:
OSCAR F. GUNZ,
C. SEDGWICK.