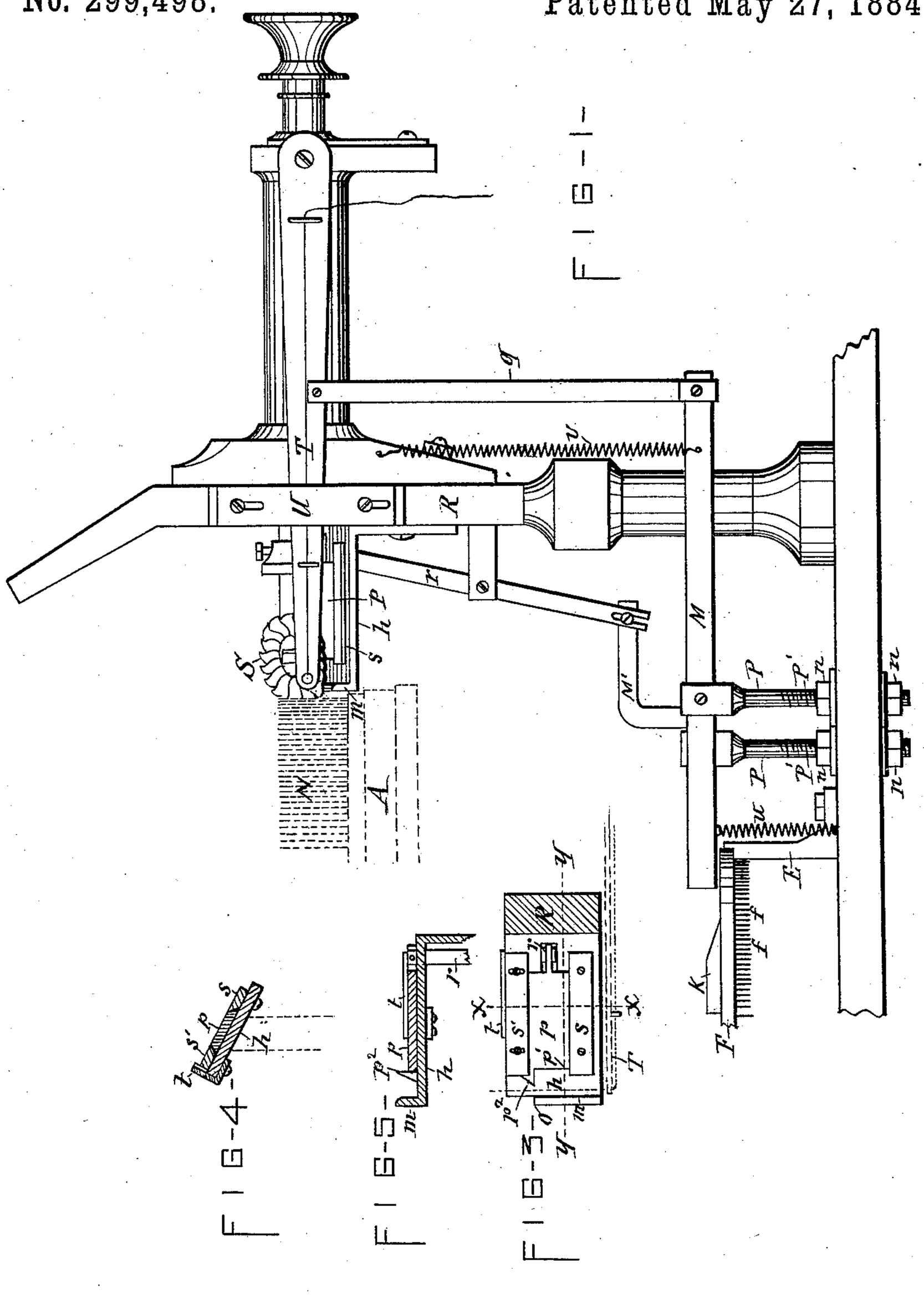
(No Model.)

4 Sheets—Sheet 1.

J. TERWILLEGER.

KNITTING MACHINE.

No. 299,498. Patented May 27, 1884.



WITNESSES

C. Bendixon

Wm. C. Raymond

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(No Model.) 4 Sheets—Sheet 2.

J. TERWILLEGER.

KNITTING MACHINE.

No. 299,498. Patented May 27, 1884.

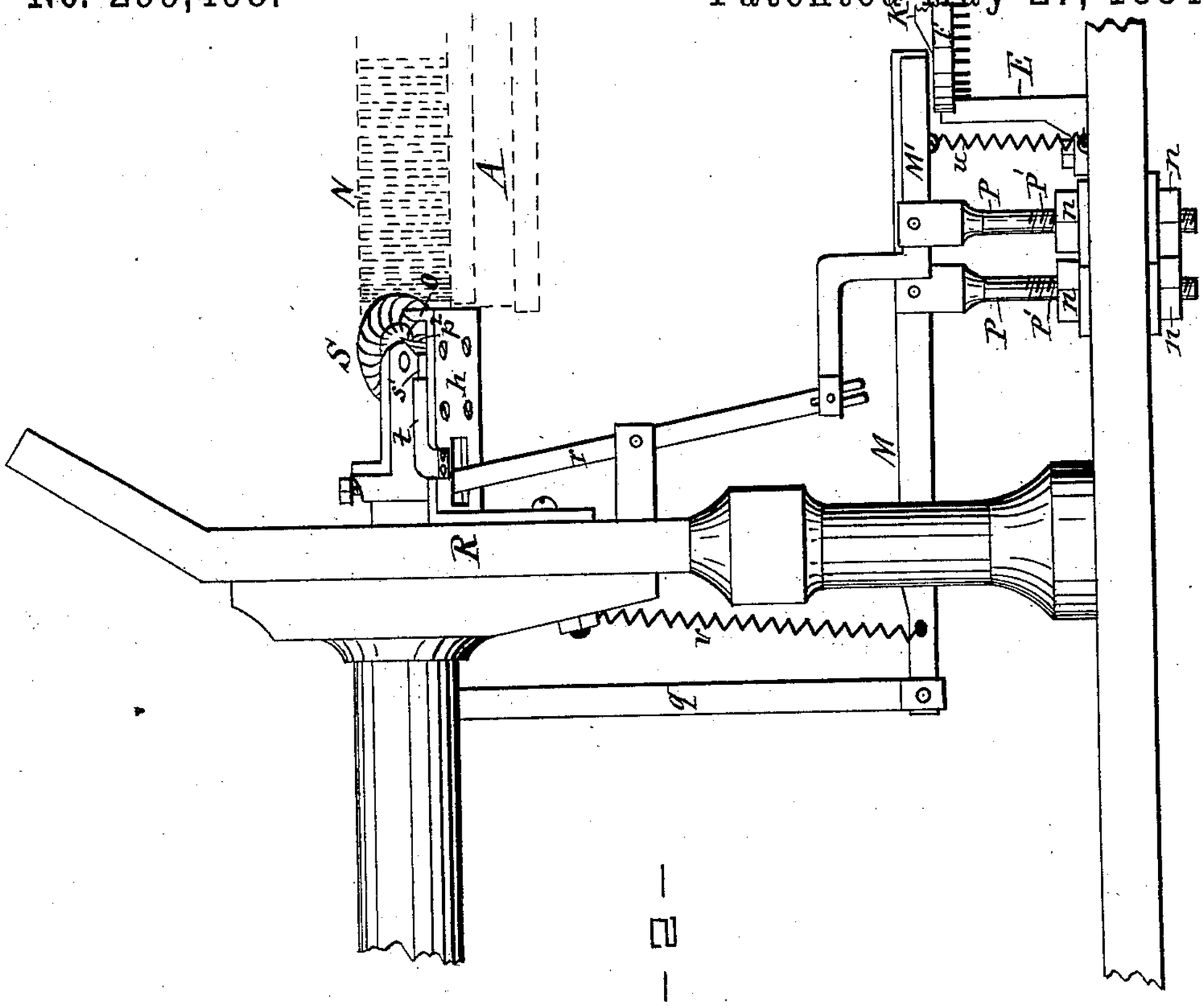

FIG. 2.

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(No Model.) 4 Sheets—Sheet 3.

J. TERWILLEGER.

KNITTING MACHINE.

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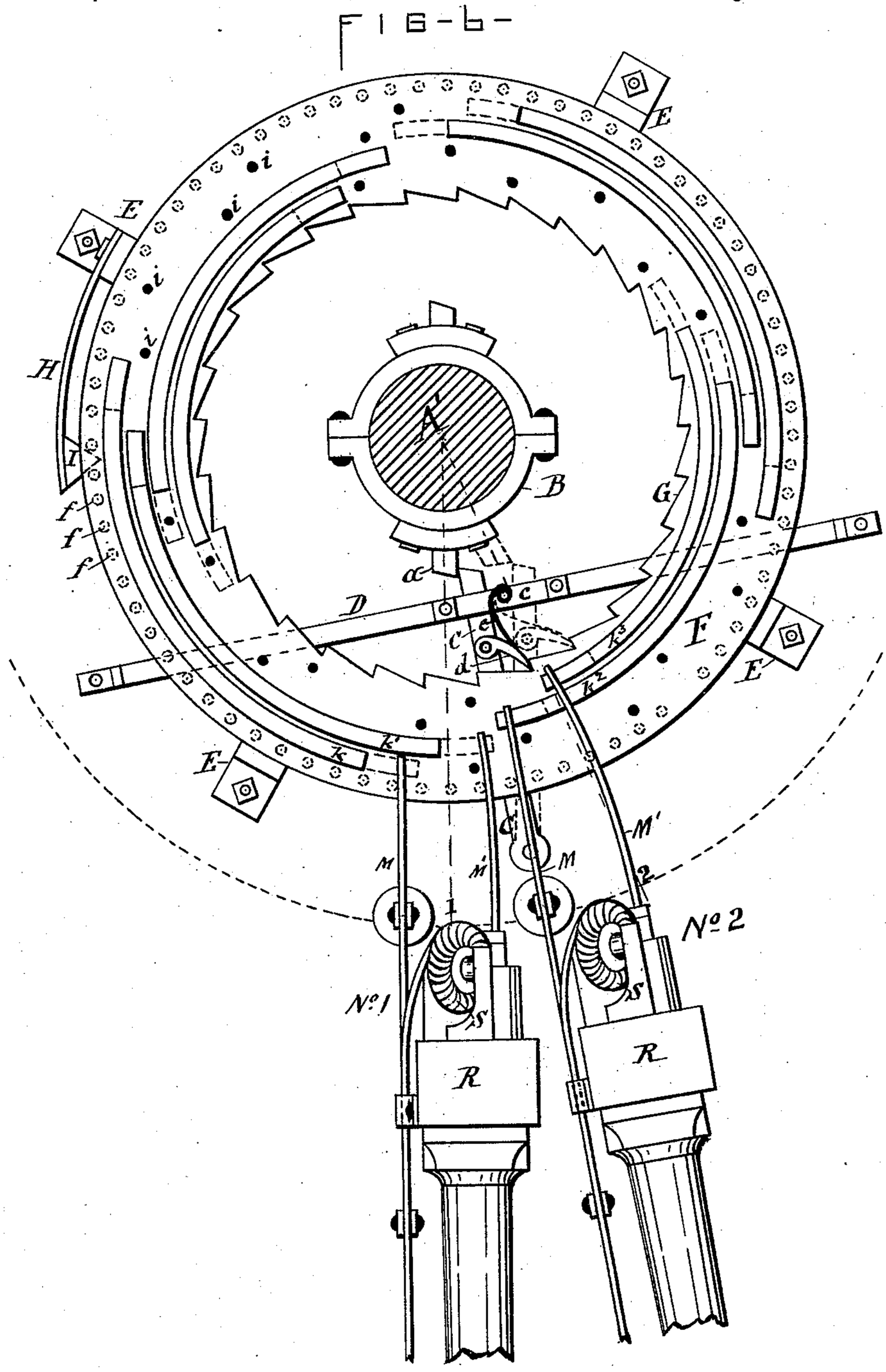

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(No Model.) 4 Sheets—Sheet 4.

J. TERWILLEGER.

KNITTING MACHINE.

No. 299,498. Patented May 27, 1884.

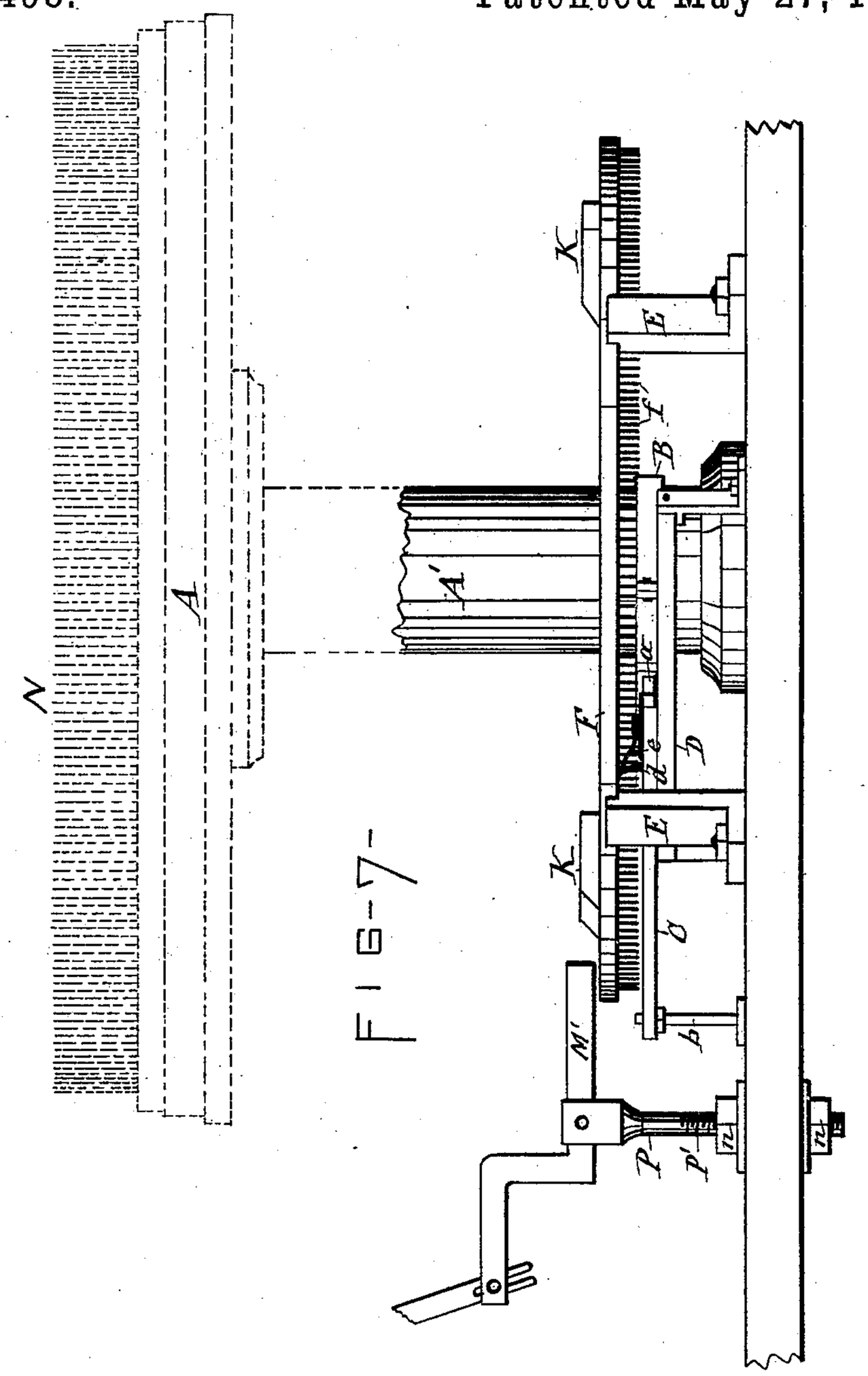

FIG-7-

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UNITED STATES PATENT OFFICE.

JOHN TERWILLEGER, OF AMSTERDAM, NEW YORK, ASSIGNOR OF ONE-HALF TO THE GREENE KNITTING COMPANY, OF NEW YORK.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 299,498, dated May 27, 1884.

Application filed February 8, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN TERWILLEGER, of Amsterdam, in the county of Montgomery, in the State of New York, have invented new and useful Improvements in Knitting-Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in improved means for producing automatically on a circular-knitting machine a circumferentially-striped single-threaded fabric, all as hereinafter more fully described, and specifically set forth in the claims.

In the accompanying drawings, Figures 1 and 2 are elevations taken at opposite sides of the post, which carries the loop-wheel and the mechanism for severing the thread and reintroducing the same into the needles of the machine. Fig. 3 is a detached plan view of the plate which carries the thread-severing knife. Fig. 4 is a transverse section of the said plate, taken on line *x x*. Fig. 5 is a longitudinal section of the same on line Y Y. Fig. 6 is a plan view taken below the needle-cylinder, and illustrating the mechanism for transmitting motion to the thread severing and supplying mechanism; and Fig. 7 is an elevation of the same.

Similar letters of reference indicate corresponding parts.

A represents the needle-cylinder of what is termed a "circular-knitting machine," carrying the bearded needles N in an upright position on its periphery.

S denotes the loop-wheel, which is supported on a post, R, at the side of the needle-cylinder, and serves to pass the thread or yarn into the needles, said thread or yarn being conducted to the loop-wheel by a thread-guide, T, arranged at the side of the loop-wheel and having an eye in proximity thereto, through which eye the thread passes.

In knitting single-threaded striped fabrics, I place at each knitting-point of the needle-cylinder two loop-wheels, S S, side by side, and sufficiently near each other to allow them to co-operate with one and the same set of the usual and well-known mechanism required in the process of knitting. Each of said loop-wheels I supply with a set of the following thread-severing and thread-guiding mechanism: Under the loop-wheel S, I arrange a plate, *h*, which is secured in position by a vertical shank on the end of said plate bolted to the post R, said plate having across its front end, adjacent to the needle-cylinder, an upward-projecting shoulder, *m*, which terminates with a square sharp-edged end, *o*, for the purpose presently described. Upon top of the plate *h* slides longitudinally, or at right angles to the shoulder *m*, a plate, *p*, having its front end shaped to correspond to the adjacent side of said shoulder, against which it abuts in its movement. From the said front of abutting end *p'* of the sliding plate *p* projects a knife, p^2, the cutting-edge of which is in range with the sharp-edged end *o* of the shoulder *m*, the latter constituting a cutting-edge, which, in conjunction with the knife p^2, operates in the form of shears. The sliding plate *p* is guided in its movement by two plates, *s s'*, secured to the supporting-plate *h* at opposite sides of the sliding plate, and fitted thereto with dovetail or overlapping edge, so as to properly hold the sliding plate down upon the supporting-plate. One of the guides, *s*, is fastened in its position, while the other guide, *s'*, is made movable, laterally, in any suitable and well-known manner, and is pressed against the edge of the sliding plate by a spring-plate, *t*, secured to the supporting-plate *h*, and bearing against the outer edge of the guide-plate. The guide-plate *s'* is thus rendered self-adjusting, to compensate for the wear and abrasion at the edge of the sliding plate.

The thread-guide T, I pivot at its rear end, so as to allow its front end next to the loop-wheel to oscillate vertically. A plate, U, fastened to the side of the post R and lying across the thread-guide, guides and sustains laterally the free end of the latter. When the thread-guide is in its elevated position, the thread is thrown onto the loop-wheel S, and is thus carried into the needles N. By depressing the thread-guide the thread is thrown off the loop-wheel and down onto the plate *h*, and caused to lie across the same directly back of the shoulder *m* thereof. By moving forward the sliding

plate *p*, the knife p^2 thereof, in conjunction with the sharp-edged end *o* of the shoulder *m*, severs the aforesaid thread, and the end of the sliding plate abutting against said shoulder grasps the intervening end of the severed thread, and prevents it from slipping back and drawing out of the eye of the thread-guide.

In order to bring the aforesaid loop-wheels and their respective thread-severing and thread-guiding mechanism alternately into action, so as to produce circumferential stripes in the fabric, and to effect this automatically with the rotation of the needle-cylinder A, I employ the following instrumentalities: On the hub or spindle A′ of the needle-cylinder is clamped a collar, B, which has one or more cams, *a*, projecting from it. C is an arm pivoted at one end to a post, *b*, and having its free end lying in the path of the cams *a*, and supported on a cross-bar, D, which is rigidly secured to the table or stand plate, and has attached to its top a guide-plate, *c*, which passes across the top of the arm C, to hold it down on the bar D, and is of sufficient length to allow the arm to swing laterally the distance required for the purpose hereinafter explained. Upon posts or blocks E E, firmly attached to the table or stand-plate, is movably mounted and guided an annular plate, F, concentrical with the axis of the needle-cylinder. This plate is provided or formed with a circular ratchet, G, with which engages a pawl, *d*, pivoted on the arm C, before described, and held yielding in its said engagement by means of a spring, *e*, which is secured at one end to the bar D or its plate, *c*, and bears with its free end on the pawl *d*. The effect of the devices thus far described is as follows, viz: The cam *a* on the collar B, fixed to the rotating spindle A′, encountering the free end of the arm C, swings the latter sufficiently to cause the pawl *d* to push the plate F the distance of one of the ratchet-teeth G. The pressure of the spring *e* on the pawl *d* forces the arm C back to its original dormant position after it is released from the cam *a*. It will thus be observed that the plate F receives an intermittent rotary motion, the intervals of its movement depending on the number of cams applied to the collar B.

f f denote a series of pins projecting in this case from the under side of the plate F, and arranged equidistantly apart in a circle concentric with the plate. H is a dog for holding the plate F while the pawl *d* moves from tooth to tooth of the ratchet G, said dog consisting of a V-shaped head, I, held yieldingly interlocked between two adjacent teeth of the ratchet, said teeth in this instance consisting of the pins *f*, before described. It will be observed that the convergent edges of the dog-head I will crowd between two of the pins *f* until both of said pins are brought to bear against the dog, and thus invariably hold said plate in its proper position.

K, K′, K^2, and K^3 represent two sets of segmental cams adjustably secured to the top of the plate F, which latter is provided with a series of bolt-holes, *i i*, arranged around the plate to admit of fastening the cams at different points in the circumference of the plate, and thus correspondingly change the action of the levers M and M′, which, in conjunction with certain other means hereinafter described, transmit motion, respectively, to the oscillating thread-guide T and to the thread-severing mechanism hereinbefore described. There are two sets of levers M and M′, one set for each loop-wheel. Said levers are fulcrumed on a post, P, secured to the table or stand plate of the machine, and their respective free ends are extended over the top of the disk F. The levers M and M′ of one loop-wheel are arranged to be actuated by the outer set of cams, K and K′, and the levers of the other loop-wheel reach over the outer set of cams and are adapted to be actuated by the inner set of cams, K^2 and K^3. The opposite end of the lever M is connected with the oscillating thread-guide T by pitman *g*, and the same end of the lever M′ is connected with lever *r*, which is pivoted on the post R, and has its upper end connected with a sliding plate, *p*. The rotation of the disk F carries the two sets of cams K and K′, K^2 and K^3, successively under the free end of the two sets of levers M and M′, and thereby raises said end. The resultant depression of the opposite end of one lever draws down the thread-guide and causes the same to throw the thread off the loop-wheel S onto the plate *h*. The succeeding depression of the rear end of the lever M′ swings the lever *r*, which in turn pushes forward the sliding plate *p*, and first causes the knife p^2 thereof to sever the thread laid on the plate *h* by the thread-guide, in the manner before described, and after severing the said thread the end of the sliding plate presses the end of the severed thread against the shoulder *m*, and thus firmly holds the same until the cam of the plate F has passed from under the lever M′, when a spring, *u*, connected with the free end of said lever and with the stand-plate, draws said end of the lever down and causes the same to withdraw the sliding plate from its before-described position by the medium of the lever *r*, and thus releases the thread. The cams K and K^2 having also passed from under the levers M, the thread-guides T are thrown up by a tractile spring, *v*, connected to the upper portion of the post R and to the rear end of the lever M, and drawing the latter upward. The upper thrust of the thread-guide throws the released thread onto the loop-wheel S, which carries it into the beard of the knitting-needles N.

In order to render the thrust of the levers M M′ adjustable, so as to produce the proper action of the thread-guide and thread-severing mechanism, I attach the fulcrum-post P to the stand-plate by means of a screw-threaded shank, P′, on the base of the post passing

through a suitable aperture in the stand-plate, and tightening-nuts *n n*, applied to the shank P, above and below the stand-plate. This allows the post to be raised and lowered, and consequently the thrust of the lever to be diminished or increased, as may be desired.

It will be observed that by means of the lever C the plate F receives a differential movement from the needle-cylinder, the latter moving the distance from point 1 to point 2, as shown in Fig. 6 of the drawings, while the plate F moves the distance from one to another of the ratchet-teeth G; hence the needle-cylinder travels from one loop-wheel past the other loop-wheel, while one set of levers M and M′ is encountered by the cams of the plate F, and the other set of levers leave their respective cams on the aforesaid plate. The cams K^2 and K^3 are terminated at such a distance from the advancing end of the cams K and K′ as to cause the levers M and M′ to be actuated by the cams K and K′ in time to cause the thread-guide of the loop-wheel No. 1 to feed its thread to the needle-cylinder before the thread of the other loop-wheel S is severed. There is a sufficient distance between the thread-severing knife of loop-wheel No. 1 and the needle-cylinder to leave the requisite length of thread to be taken into the needle-cylinder by loop-wheel No. 2, thus avoiding interruption in the process of knitting.

Having described my invention, what I claim is—

1. In combination with the needle-cylinder, needles, and loop-wheel of a knitting-machine, a thread-supporting plate arranged beneath the loop-wheel, an oscillating thread-guide adapted to throw the thread off the loop-wheel onto the aforesaid plate, a stationary shearing-blade fixed to said plate, a cutter arranged to move across the shearing-blade, a clamping device for holding the severed thread, and mechanism for operating the thread-guide and thread-severing and thread-clamping devices, substantially as set forth.

2. In combination with the needle-cylinder, needles, and loop-wheel of a knitting-machine, a vertical oscillating thread-guide, a thread-supporting plate arranged beneath the loop-wheel and provided with a stationary shearing-edge and with a stationary thread-clamping shoulder, a thread-clamping plate sliding on the thread-supporting plate and having integral with it a cutter arranged in line with the stationary shearing-edge, and mechanism for transmitting motion to the thread-guide and to the thread-severing and thread-clamping devices, substantially as specified.

3. In combination with the loop-wheel, the plate *h*, having the front shoulder, *m*, with the cutting-edge O on one end thereof, the sliding plate *p*, having the abutting-edge *p′*, provided with the knife p^2, in range with the cutting-edge O, the lever *r*, connected with the plate *p*, the oscillatory thread-guide T, adapted to throw the thread off the loop-wheel onto the plate *p*, and mechanism for operating the lever *r* and the thread-guide, substantially as shown and described.

4. In combination with the plate *h*, provided with the cutting-edge O, and with the stationary guide *s*, and the sliding plate *p*, provided with a knife, p^2, the adjustable guide *s′*, and spring *t*, pressing against the outer side of said guide, substantially as described and shown, for the purpose set forth.

5. In combination with the spindle A′, needle-cylinder A, oscillatory thread-guide T, and the within-described thread-severing mechanism, the collar B, provided with cams *a*, the annular disk F, arranged concentric around the spindle and adapted to rotate independently thereof and provided with the ratchet G and pins *f f*, the arm C, pivoted outside of the disk F, and having the pawl *d*, engaging the ratchet G, the dog H, the cams K, K′, K^2, and K^3, and the levers M and M′, pitman *g*, and lever *r*, substantially as described and shown.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Amsterdam, in the county of Montgomery, in the State of New York.

JOHN TERWILLEGER. [L. S.]

Witnesses:
WM. W. GREENE,
WM. G. WALDRON.