No. 660,577. Patented Oct. 30, 1900.

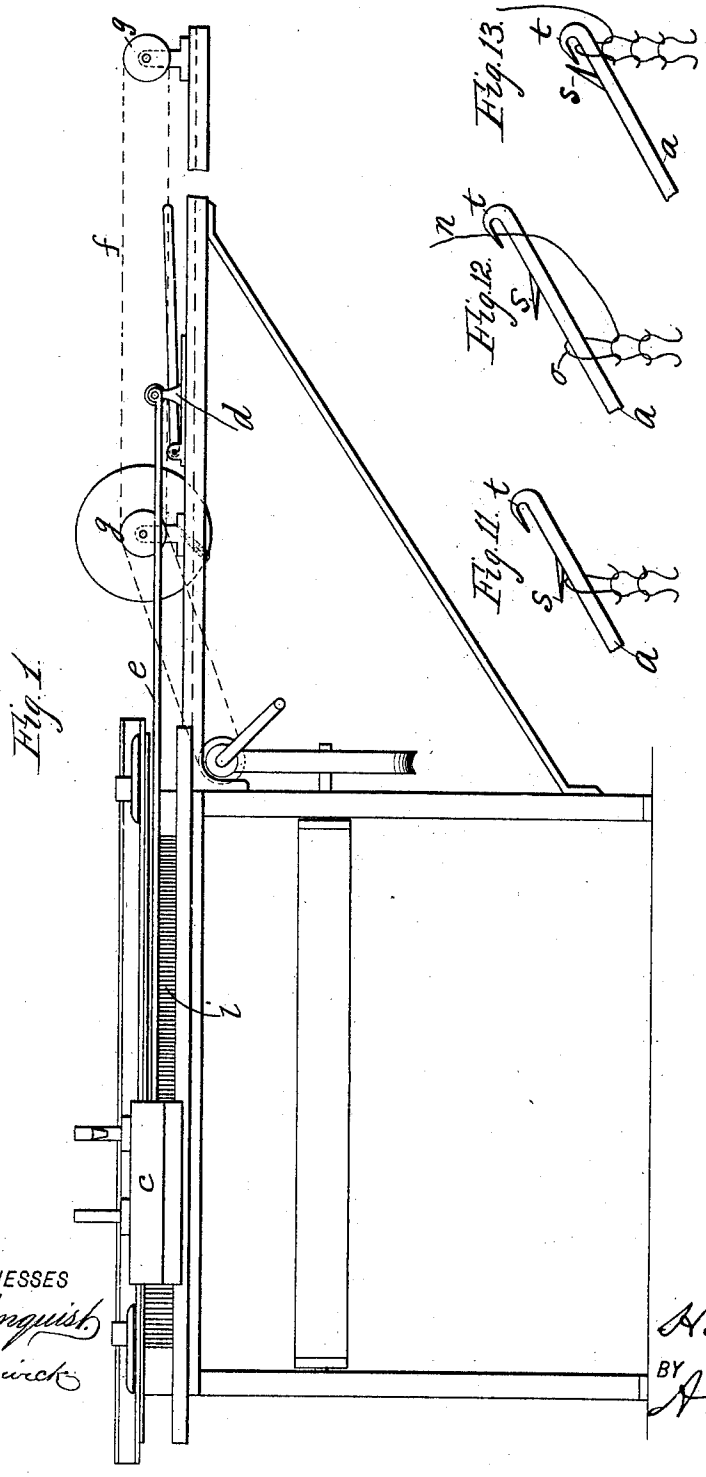
H. A. KLEMM.

KNITTING MACHINE.

(Application filed Feb. 7, 1900.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES

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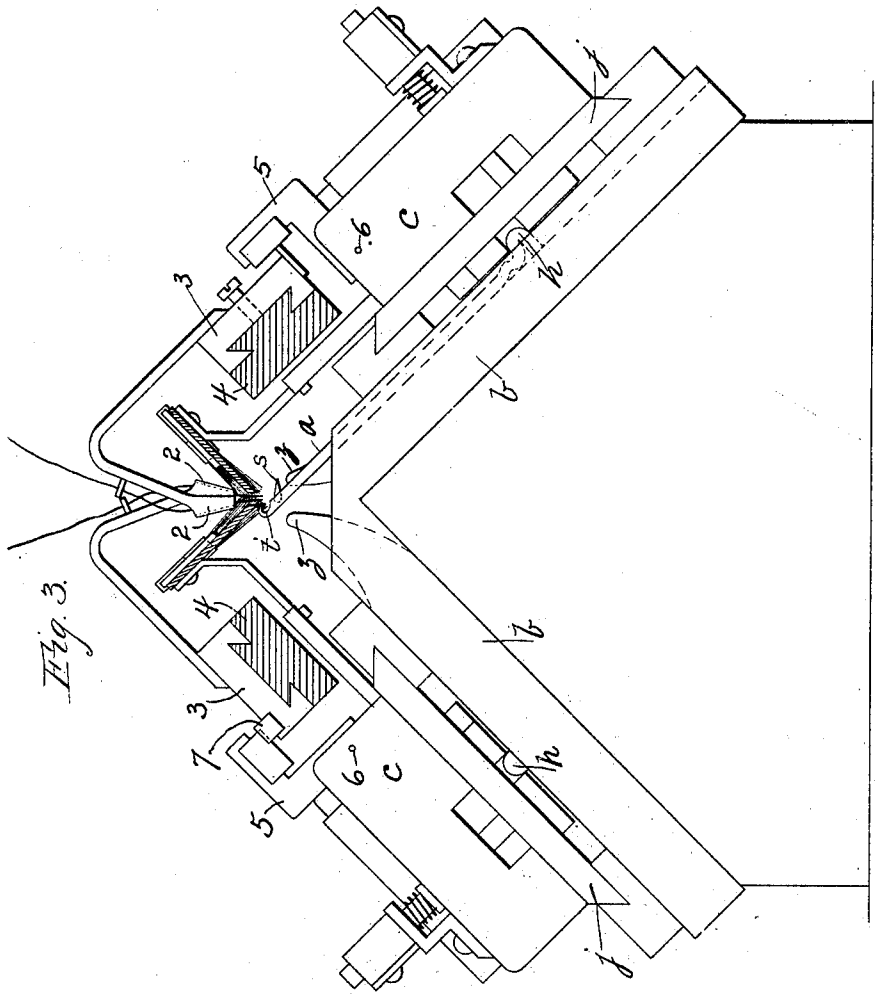


Fig. 3.

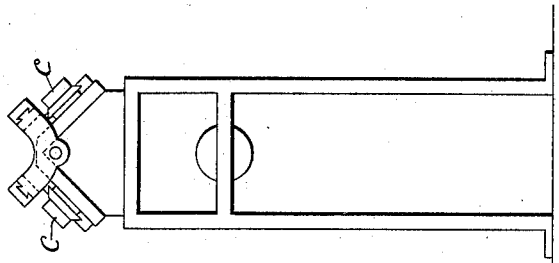


Fig. 2.

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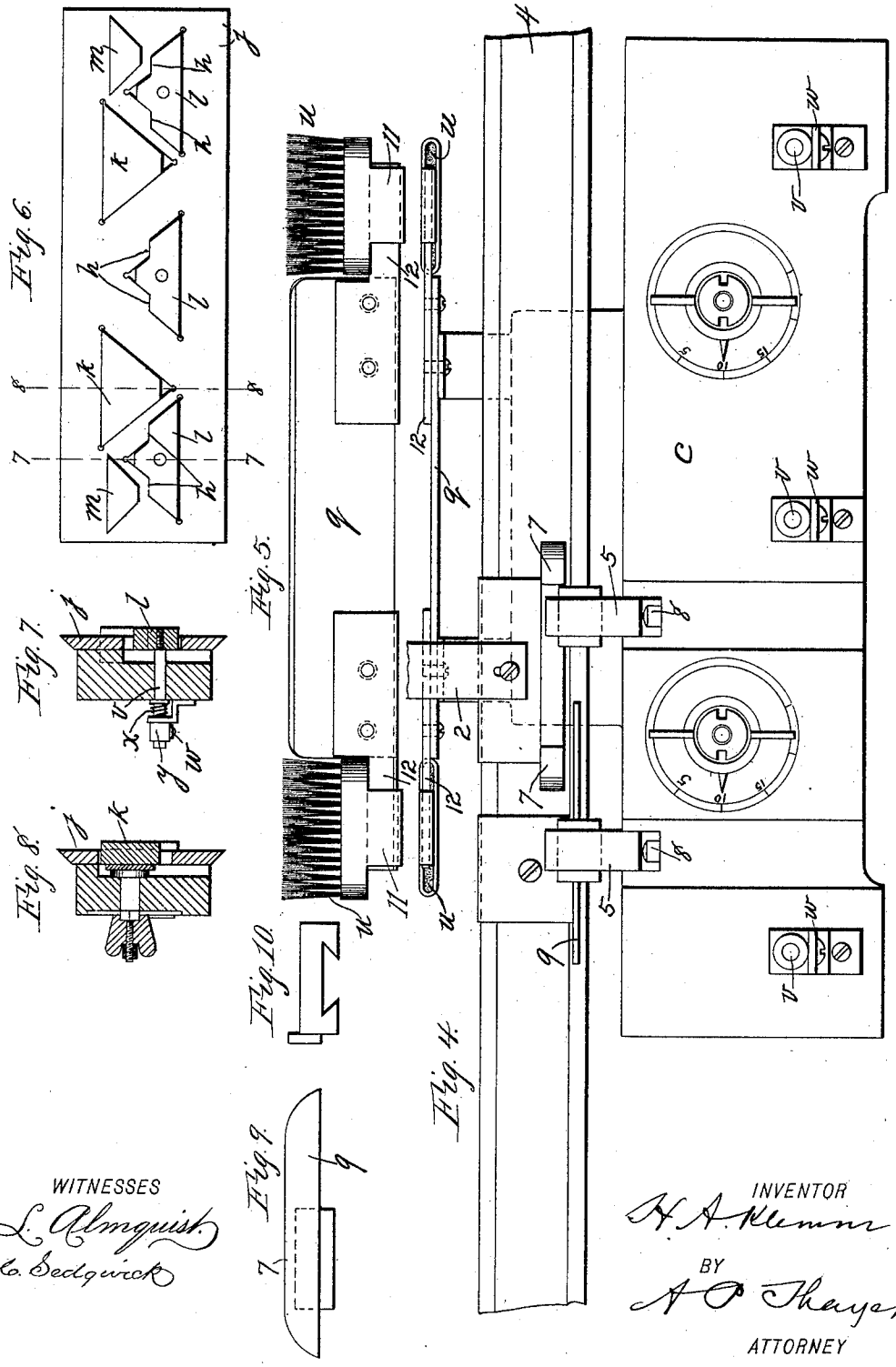
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UNITED STATES PATENT OFFICE.

HERMANN A. KLEMM, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO JULIUS KAYSER, OF SAME PLACE.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 660,577, dated October 30, 1900.

Application filed February 7, 1900. Serial No. 4,321. (No model.)

To all whom it may concern:

Be it known that I, HERMANN A. KLEMM, a citizen of the United States of America, and a resident of the borough of Brooklyn, New York city, and State of New York, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a specification.

My invention relates to straight-knitting machines; and the object is to provide more simple construction of the cams and to facilitate higher speed. This object I attain by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a general view of my improved machine in front elevation. Fig. 2 is an end elevation as seen from the left hand of Fig. 1. Fig. 3 is an end elevation of the working parts considerably enlarged, with the slideways of the transversing thread-carriers in transverse section. Fig. 4 is an end view of one of the cam-carriages and its attachments, also part of one of the thread-carrier slideways and part of a thread-carrier, also enlarged. Fig. 5 is a plan view of one of the knives for preventing the closing of the latches. Fig. 6 is a face view of a cam-carriage inverted and showing the cams, the scale being about half the scale of Figs. 3 and 4. Fig. 7 is a transverse section of the cam-carriage on line 7 7 of Fig. 6. Fig. 8 is a transverse section of the cam-carriage on line 8 8 of Fig. 6. Fig. 9 is a side elevation, and Fig. 10 an end elevation, of a tripper for the thread-carrier-driving latches. Fig. 11 is a diagram showing the position of a needle and the loop on it prior to the action of the cams, the needle being in the intermediate position of its throw. Fig. 12 is a diagram showing the positions after the first action of the cams, the needle being in the uppermost position. Fig. 13 is a diagram showing the positions when the stitch is cast off, the needle being in the lowermost position.

The general construction of the machine is practically the same as in other knitting-machines and will only be generally described sufficiently for a proper understanding of the improvements which I claim, which will be more particularly described, the said improvements being mainly in the particular contrivances of the cams.

Two straight rows of needles *a* are placed in two upper sides of the frame *b*, inclined toward each other, with a space or slot between their upper edges for the fabric produced to descend between them. Supported on each of the inclined sides is a carriage *c*, reciprocated by a traveler *d*, to which it is connected by a rod *e*, said traveler being suitably connected with an endless chain *f*, running over pulleys *g*, to which motion is imparted by any suitable driving-belt. The needles are of the well-known hook-and-latch construction, each having an upright shank *h* at the lower end for being operated by the cams attached underneath the carriage *c* in such manner as to move the needles upward and downward as the carriage is moved forward and backward over the needle-beds *i*. The plate *j*, Figs. 3 and 6, represents the under surface of one of the carriages with the cams mounted on it. If it be considered as belonging to the carriage *c* of Fig. 4 or of the front side of Fig. 1, it must be regarded as reversed lengthwise. If considered as belonging to the carriage of the other side of the machine, it must be regarded as turned on its lower edge face upward. On this plate are two double-acting drawing-cams *k*, three lifting-cams *l*, and two cams *m* for returning the needles to the intermediate position after the stitch-forming operation of the needles by the cams passing over them, these being the complement of cams for effecting two operations of the needles at each traverse of the cams and constituting what I call a "two-lock" machine. In a single-lock machine a cam *m* will be placed each side of the single drawing-cam. With such cams the needles *a* being, when the machine is in operation, in the middle position, Fig. 11, will be at once thrust up to the upper limit of movement for reëngaging the thread *n* for new loops, as in Fig. 12, and the drawing-cam *k* will at once draw the needles down, casting off the loops *o* and completing the stitches, as in Fig. 13. The cams *l* are constructed with an offset *h* in each working face, the object of which is to afford momentary rest or dwell

of the needles when being raised from the lower position, as when first starting the machine, and when after being drawn down by one cam in a two-lock machine they have to be raised up to the next cam such rest of the needles lessens their momentum and favors higher speed of the machine. With the cams so arranged the usual knives *q* are employed to keep the latches *s* open when the hooks *t* are lifted up to take the thread, except that brushes *u* are substituted for certain portions of the knives, locating them where the hooks of the needles are thrust into the brushes lengthwise of the bristles or other brush elements as they are raised by the cams, so that opening of the latches will be insured before the hooks reach the ends of the knives by these yielding and harmless elements and damage by the possible striking of the latches against ends of the knives will be avoided. This also facilitates higher speed of the machine; but such brushes have been used before and I do not claim them broadly. These brushes may be attached in any approved way. As herein shown, the brush-heads are formed with a socket 11 on the back, adapted for application to a prong 12 attached to and projecting lengthwise from the knife, one at each end, onto which the sockets may be pressed, so as to be held by friction or by set-screws or other means.

The lifting-cams *l* are each connected by a rod *v* with a cam *w*, which hold them out of action when required, and a spring *x* is provided with each rod to return the cams to and retain them in their working positions, with a collar *y* to stop the springs when the cams are in the right positions. The cams are pivoted to the collars *y*, so as to act on the brackets *z* when turned, and thus lift the rods *v*.

The comb-points *z* for casting off the stitches and the thread-carrying guides 2 are practically the same as in other machines, and also the slides 3 for carrying the thread-guides, said guides being fitted to reciprocate on the slideways 4 and being operated by the driving-latches 5, pivoted at 6 on the carriage *c*, so as to engage the catch-hooks 7. The springs 8 press the driving-latches down when escaping from tripper 9 into engagement with hooks 7.

What I claim as my invention is—

1. The combination with a drawing-cam both sides of which are adapted for drawing the needles the full length of their movement for forming and casting off the stitches according as the cams are moved one way or the other, a lifting-cam to each side of the drawing-cam causing the full rise of the needle in both forward and backward movements, and cams for setting the needles in the intermediate position after the stitch-forming operations of the needles by shifting the needles from the uppermost position to the middle position.

2. The combination with a drawing-cam both sides of which are adapted for drawing the needles the full length of their movement for forming and casting off the stitches according as the cams are moved one way or the other, a lifting-cam to each side of the drawing-cams, said lifting-cams having the offsets in their working faces for momentary dwell of the needles, and cams for setting the needles in the intermediate position after the stitch-forming operations of the needles.

3. The combination of two drawing-cams both sides of which are adapted for drawing the needles the full range of their drawing movement, an intermediate lifting-cam adapted to lift the needles to and in advance of both drawing-cams, a lifting-cam to the outer side of each drawing-cam, said lifting-cams having the offsets in their working faces for momentary dwell of the needles, and cams for setting the needles in the intermediate position after the stitch-forming operations of the needles.

Signed by me at New York, N. Y., this 5th day of February, 1900.

HERMANN A. KLEMM.

Witnesses:
A. P. THAYER,
C. SEDGWICK.