(No Model.)

# R. A. GAGE.

## LOOPING ATTACHMENT FOR KNITTING MACHINES.

No. 431,047. Patented July 1, 1890.

FIG. 1.

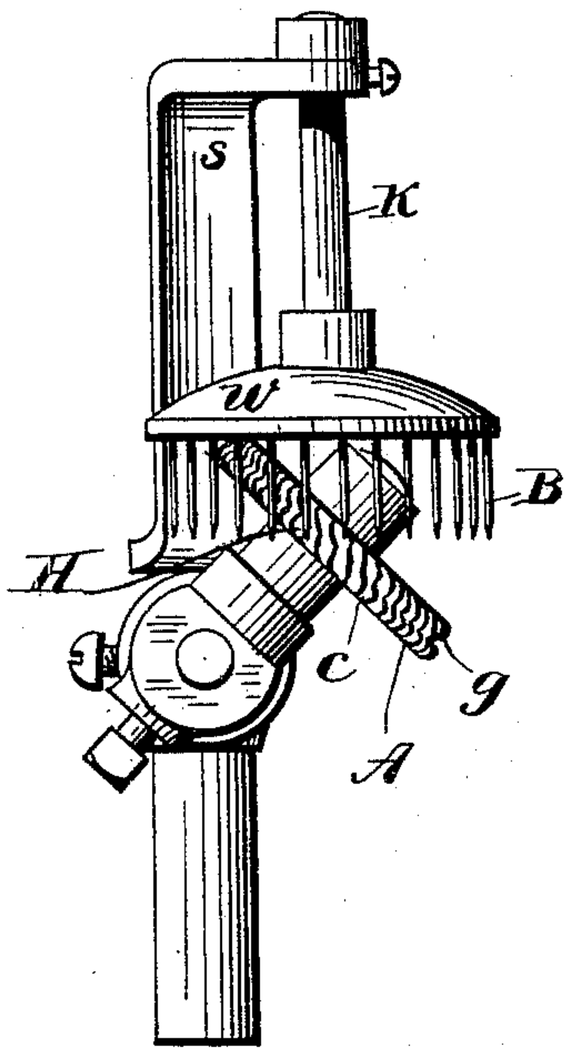



FIG. 2.

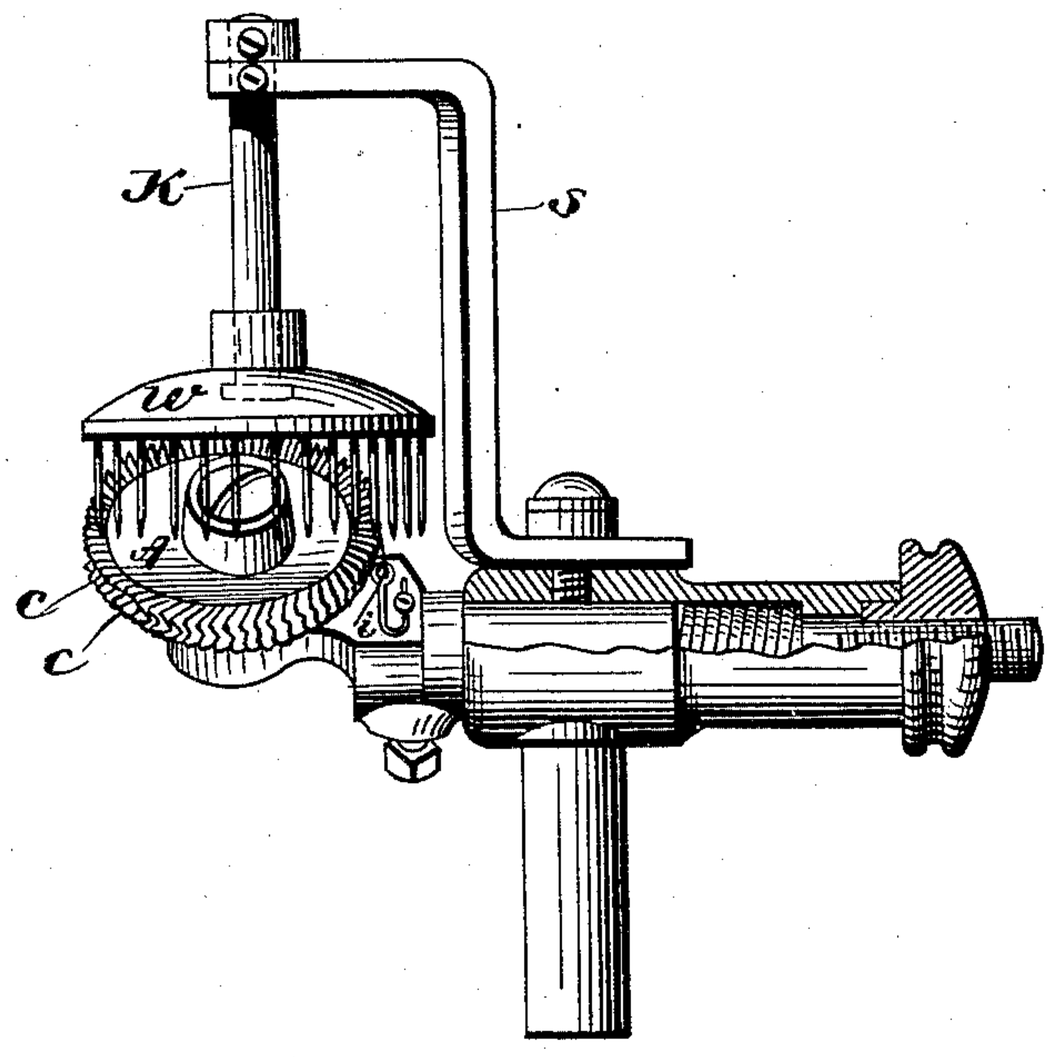
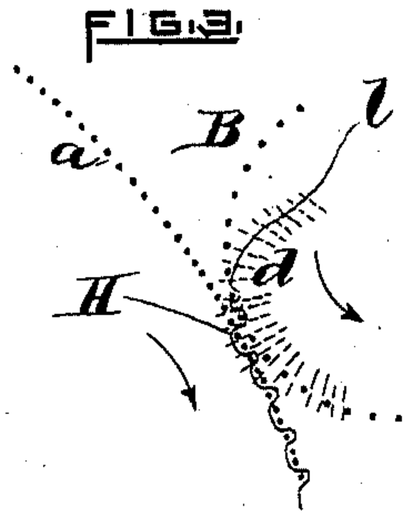



FIG. 3.



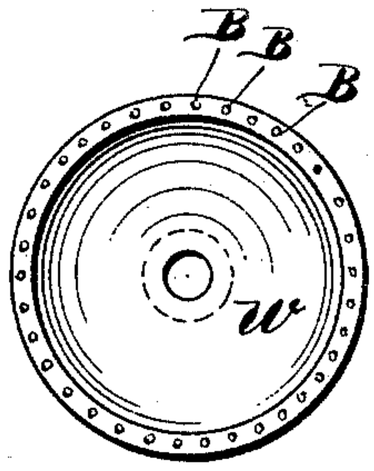




FIG. 4.

WITNESSES.

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# UNITED STATES PATENT OFFICE.

RICHARD ANTHONY GAGE, OF PAWTUCKET, RHODE ISLAND.

## LOOPING ATTACHMENT FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 431,047, dated July 1, 1890.

Application filed July 31, 1889. Serial No. 319,294. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD ANTHONY GAGE, of the city of Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Looping Attachments for Knitting-Machines; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

This invention is a modification of the form of invention shown in Figures 1, 2, and 3 in the drawings accompanying my application for a patent for improvements in circular-knitting machines filed in the United States Patent Office February 8, 1886, Serial No. 191,131, and is the particular modification delineated by Figs. 4 and 5 therein.

The invention relates to that class of knitting-machines employed to produce stockinets, plush goods, eider-downs, and fabrics of kindred nature wherein an extra thread or threads may be interlocked mainly to provide material to form a nap upon the back of the fabric; and the invention consists, essentially, of a wheel with pins that depend therefrom, set near the periphery on the concave face thereof, which pins co-operate with the feed-wheel and the needles without springing the needles, and means for attaching the wheel to the knitting-machine.

Referring to the drawings, Fig. 1 represents my looping attachment in elevation as viewed from the center of a circle of co-operating needles. Fig. 2 is a view of the parts represented by Fig. 1, taken at a point fronting the feed-wheel, and representing the feed-wheel-supporting devices partly in section. Fig. 3 represents a portion of the circle of needles of a circular-knitting machine, a portion of the circle of fingers, part of the leaves of the feed-wheel in broken lines, and the extra thread interlooped about the needles, beginning at the point where the needles and pins mesh with the feed-wheel; and Fig. 4 is a plan of the concave surface of the looping-wheel, the small circles near the periphery indicating the places for the pins.

Similar letters refer to like parts in all the drawings.

The body of the looping-wheel W (in my application filed February 8, 1886, called a "filling-wheel,") resembles an inverted saucer. Fingers or pins B are fixed rigidly thereto near the peripheral edge on the concave face and depend perpendicularly therefrom. The fingers are usually set equidistant and operate in predetermined spaces between the leaves of the feed-wheel A. The distance between the fingers is determined by the space between the leaves of the feed-wheel, and this in turn by the space between the needles of the knitting-machine. The production of coarse goods requires fewer needles and fewer leaves and fingers in the respective wheels, and fine grades require an increased number.

The wheel W is placed in a horizontal position directly over the wheel A to the front of the line of needles. It is provided with a spindle K, supported by the stand S, which is secured to the stand of the wheel A. At the point of central contact H, Fig. 3, the leaves of the wheel A approximately assume a vertical position and become parallel to the fingers and needles. The fingers move in their circle outside the circle of needles, and on the side adjacent to the needles enter the spaces between the leaves of the feed-wheel, their points extending below the tops of the needles and between the beards of the needles and the center of the wheel A. The rotation of the needles causes the wheel A to revolve, and this in turn causes the rotation of the wheel W. The wheel A is set obliquely to both fingers and needles, and at H the needles, fingers, and leaves mesh simultaneously, the fingers depressing the filling-thread into certain predetermined spaces of the wheel A and disposing of the same on the outside of the needles. As represented in Fig. 3, the predetermined spaces are every third one. The leaves of the wheel A are represented by the broken lines *d* in said figure, and at the point of central contact H extend inside the circle of needles to a depth greater than the notches *g*, which hold the thread in their peripheral edges. The fingers B move with the leaves of the wheel A in a circle outside of the circle of needles. The looping-thread is directed by the thread-guide *i* into the notches *g* of the wheel A and is carried along in the direction indicated by the arrows. Without

the co-operation of the fingers the filling-thread would be wholly deposited upon the inside of the circle of needles and would form no part of the fabric. The thread is intermittently caught by every third finger and drawn into the corresponding space between the leaves of the wheel A, so that it remains on the outside of the needle that passes into the same space. The result of the operation then is to place the filling-thread in front of one needle and back of two needles. The short loop is used to lock the thread into the fabric, and the loop passed back of the two needles is that of which the nap or plush is formed by subsequent treatment.

By varying the number of fingers in the wheel W the character of the stitches can be altered at pleasure, and the device could be used to introduce a colored thread into a fabric in a variety of ways.

The principal object sought by my invention is to interweave an extra thread into the fabric to produce such goods as stockinets, plush linings, &c., without springing the needles intermittently to place the extra thread at the back of certain needles and in front of others.

I am aware of the devices shown in English Patent No. 73 of 1873 for transferring ribbed goods to circular-knitters in order that the machine may subsequently add plain knitting to the fabric. I make no claim to the application therein set forth.

My device can be applied to knitting-machines generally, and when used with the circular-knitting machine it is in connection with the several parts that compose such machines; hence I have omitted to describe such parts, all of which are well known to those skilled in the art of knitting.

I claim as new and desire to secure by Letters Patent—

1. The combination of knitting-needles, a feed-wheel provided with leaves, a looping-wheel provided with pins, and means, as described, for supporting the looping-wheel, the leaves and pins of the said wheels co-operating, as described, with the needles, without springing any of them, to carry a thread intermittently to the front of some and back of others, substantially as specified.

2. The combination of knitting-needles, a feed-wheel, a looping-wheel provided with pins to carry a thread into predetermined spaces of the feed-wheel, and means, as described, for supporting the looping-wheel.

3. The combination of the thread-guide, a feed-wheel provided with leaves, a looping-wheel provided with pins, and means, as described, for supporting the looping-wheel, the needles, leaves, and pins simultaneously co-operating, substantially as described, to weave an extra thread into the fabric without springing any part of the needles.

4. The combination of knitting-needles, a feed-wheel provided with leaves notched on the periphery, a looping-wheel provided with pins whose points extend below the tops of the needles and carry the yarn or thread into the spaces between the leaves of the feed-wheel when in their circuit said pins pass between the beards of the needles and the center of the wheel A, and means for supporting the looping-wheel, substantially as specified.

5. The combination, with the knitting-needles of a circular-knitting machine, of a looping attachment for introducing an extra thread into the fabric, the same comprising a feed-wheel provided with notched radial leaves, a wheel provided with pins adapted to carry a thread into predetermined spaces between the leaves of the feed-wheel, whereby the thread becomes woven into the fabric and forms loops for napping on one side thereof, and means, as described, for supporting the looping-wheel, substantially as specified.

6. In combination, substantially as specified, knitting-needles, a thread-guide, a feed-wheel provided with radial leaves in mesh with the needles, a looping-wheel provided with pins which mesh with the leaves of the feed-wheel at the time the leaves mesh with the needles and constructed and combined to interweave an extra thread into the fabric without springing any of the needles, and means, as described, for supporting the looping-wheel.

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Witnesses:
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