No. 619,840. Patented Feb. 21, 1899.

F. C. REHM.

KNITTING MACHINE.

(Application filed May 9, 1898.)

(No Model.) 2 Sheets—Sheet 1.

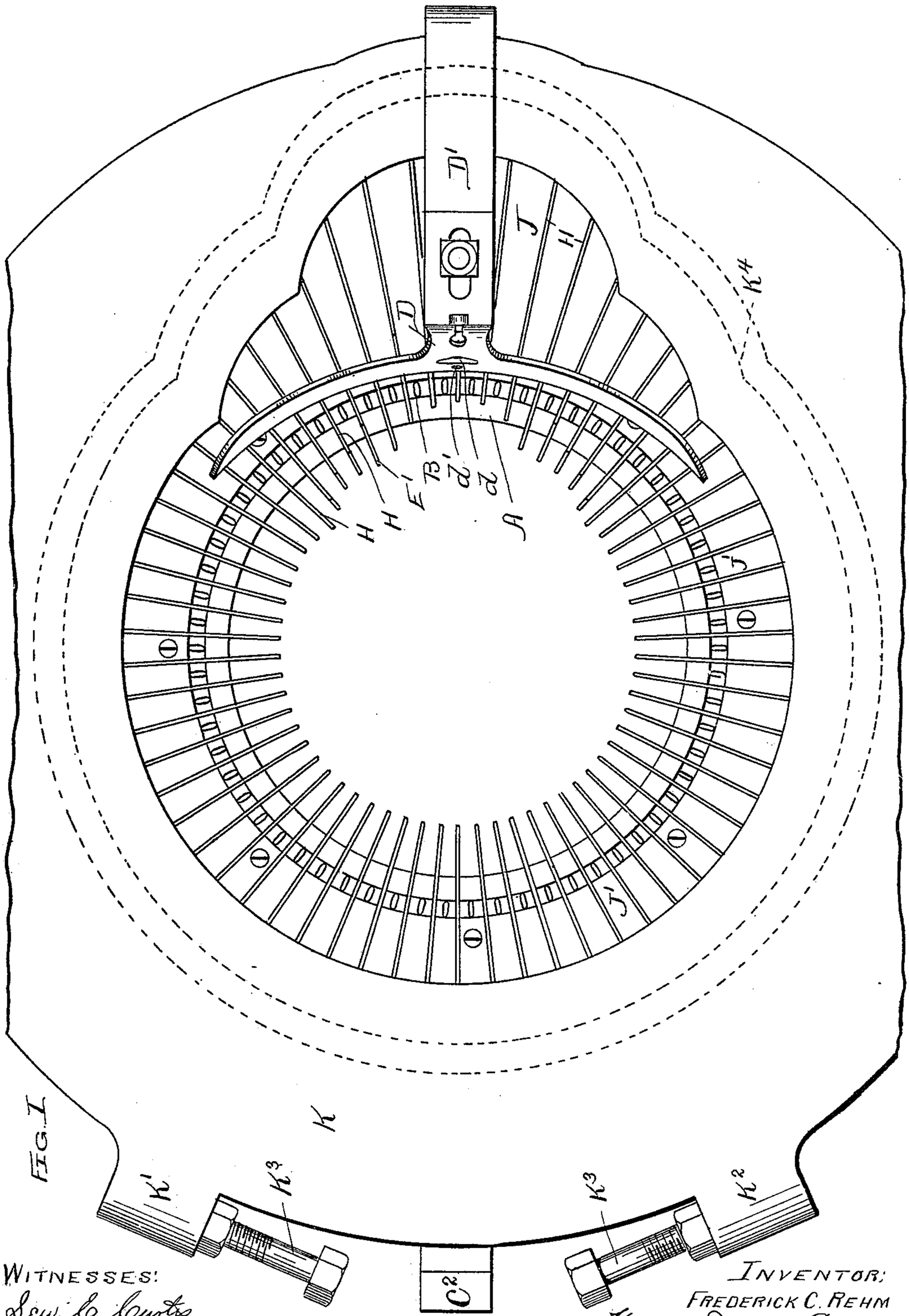


FIG. I.

WITNESSES:
Sew. E. Curtis
H. W. Munday

INVENTOR:
FREDERICK C. REHM
BY Munday, Evarts & Adcock.
HIS ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 619,840.

Patented Feb. 21, 1899.

F. C. REHM.

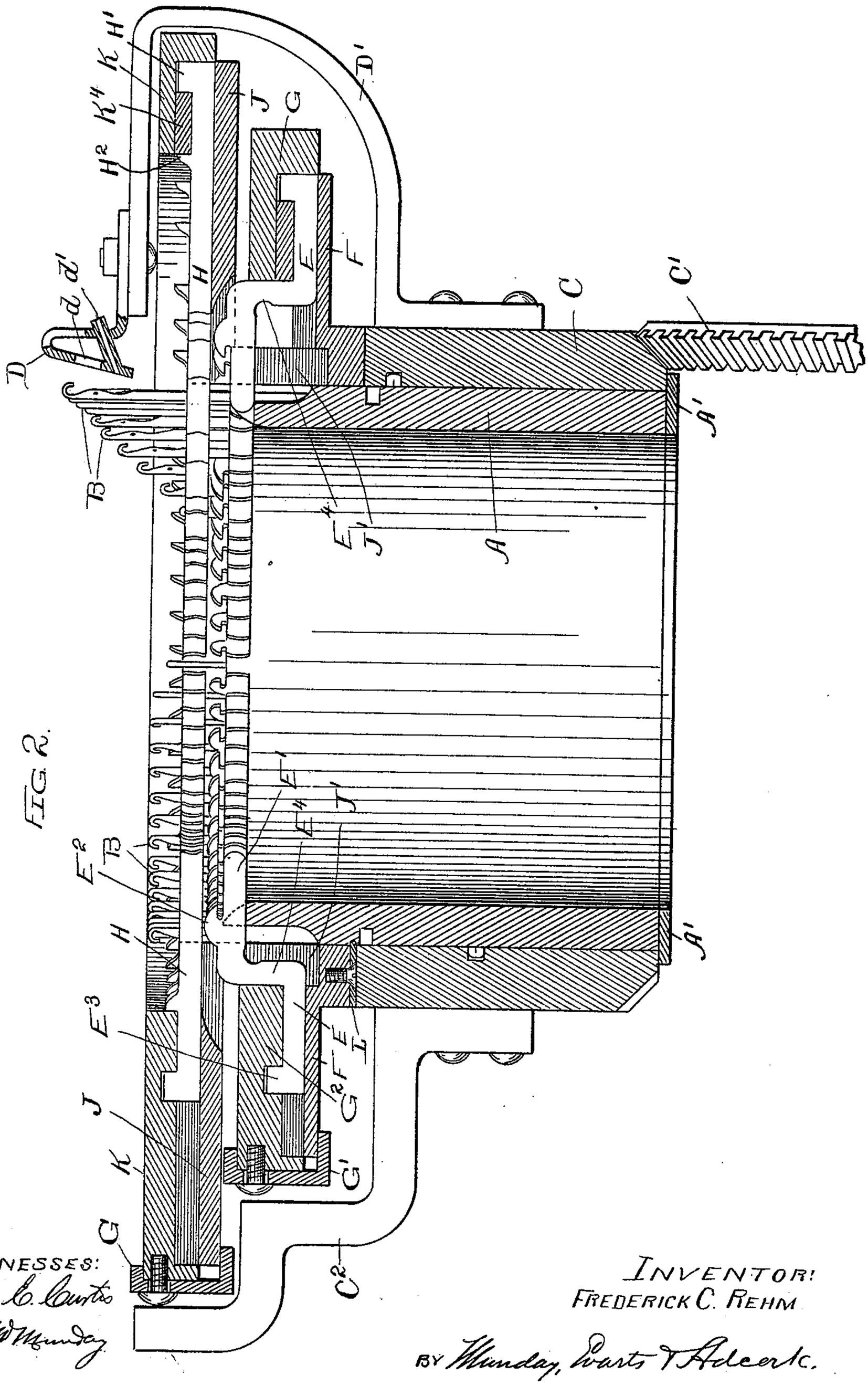
KNITTING MACHINE.

(Application filed May 9, 1898.)

(No Model.)

2 Sheets—Sheet 2.

FIG. 2.



WITNESSES:
Sew. C. Curtis
H. W. Munday

INVENTOR:
FREDERICK C. REHM
BY Munday, Evarts & Adcock.
HIS ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FREDERICK C. REHM, OF CHICAGO, ILLINOIS.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 619,840, dated February 21, 1899.

Application filed May 9, 1898. Serial No. 680,130. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK C. REHM, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Knitting-Machines, of which the following is a specification.

This invention relates to the construction of knitting-machines adapted to form loops upon the interior surface of the knitted fabric, and thereby to increase the thickness and warmth thereof. It is intended more especially for use in manufacturing hosiery and produces the same fabric as that made by the machine patented to me March 12, 1895, and numbered 535,461, and is an improvement upon my said patented machine. In my said patented machine I employed for the looping devices lifters adapted to be moved under the yarn which is to be looped and to support that portion of the same lying between adjacent needles while the latter descend, thereby forming in the yarn the loop or tuft which gives the fabric the additional thickness and warmth.

The loopers in my present invention do not sustain the yarn against the downward pull of the needles, but instead thereof they carry the yarn inward toward the axis of the machine sufficiently to form the loop, and they move radially toward the axis of the machine and are operated by mechanism located outside of the needles, so that they do not obstruct the central space of the machine nor interfere with the proper oversight of the work as it proceeds by the operator. In my present invention I also employ means for holding down the work, consisting of radially-moving holders adapted to engage the top of the work and prevent its rising, and thus serve the same purpose as the weights heretofore employed. These devices are independent of the loopers and are timed to operate subsequently to the loopers.

The nature of my invention and its details are fully set forth in the description given below and are also illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view of that portion of a knitting-machine to which my invention is applied, and Fig. 2 is a central vertical section thereof.

In said drawings, A represents the needle-cylinder; B, the needles; C, the rotating cam-cylinder whereby the needles are lifted and depressed; C′, a gear for driving the cam-cylinder, and D the yarn guide or guides, the latter supported upon the bracket D′, attached to the cam-cylinder. The guide has two openings or passages *d* and *d′* for the passage of the upper and lower yarns, the former of which is delivered to the loopers to form the loops and the latter of which is supplied to the needles to be knitted into stitches at the bases of and securing the loops. The first yarn I term the "loop-thread" and the second the "stitch-thread."

The radially-moving devices for holding the work down and which are employed in lieu of the weight usually employed, are shown at E and are supported upon the stationary ring F, which is provided with proper channels in which the holders may slide inward and outward. The holders at their acting ends are provided with inwardly-projecting guide portions E′ and an upward projection E^2, notched upon the inner side, and also with a heel E^3 and a vertical portion E^4. The holders are moved in and out by a cam-ring G, provided with the usual projections, whereby it may be rotated from the cam-cylinder C by the arm C^2. These projections are not shown, but they are of the ordinary construction and similar to those shown as applied to the cam-ring K, hereinafter described and shown at Fig. 1. When moved inward by the cam, the guide portions E′ of the holders E displace the completed fabric which may be in front of them and cause the immediately proximate portion thereof to assume a horizontal position over the guide, and this results in the top edge of the fabric entering into the notch of projection E^2, so that while such engagement lasts the notch will act to prevent any tendency the fabric may exhibit to rise above the notch. It is this feature of the invention which enables me to dispense with the weights heretofore used for holding the fabric down. The cam-ring G is provided with suitable U-shaped retainer devices G′, one limb of which extends under the supporting-plate F, and thus holds the cam-ring down in its proper operative position. That portion G^2 of the cam-ring which lies between

the heel E^3 and the upright portion E^4 of the holders is the cam proper and serves, as the ring is turned, to give the radial movements to the holders.

The loopers are shown at H, and they are supported in radial grooves in a second stationary ring J and are actuated by a second cam-ring K, having projections K′ and K^2, each provided with set-screws K^3 and standing at either side of the arm C^2. The cam proper of the ring K is shown at K^4 and acts to move the loopers in and out by reason of its entrance between the upward projections H′ and H^2 upon the loopers. At their acting ends the loopers are preferably curved inwardly to a slight degree, so as to obviate any slipping off of the yarn. The cam-ring K is provided with retainers G′, like those shown in the case of the ring G and serving the same purpose. The outline of the cam proper, K^4, is disclosed by the broken lines in Fig. 1. The loopers H serve the same purpose as the loopers of my said patent, but instead of acting upon the yarn in a vertical direction they act upon it horizontally and form the loop therein by pushing the portion of the yarn immediately in front of them inward a sufficient distance beyond the needles to give the surplus of yarn desired for the loop.

The rotating ring C is supported from the needle-cylinder by the ring A′. The ring F, supporting the holders, is sustained mainly by a cam-ring C; but it is held stationary and prevented from rising by one or more keys L, attached to its under surface and let into the outer surface of the needle-cylinder. The upper supporting-ring J is sustained from ring F by means of supporting legs or blocks J′, attached to or integral with ring J and resting upon ring F, to which they may be secured by screws or in any other suitable manner. The legs J′ pass between the holders E.

I make the loopers and the holders distinct and independent of each other, so that they may be timed to operate at proper relative times, it being desirable that the individual holders should advance and take hold of the fabric shortly after the loopers, which lie between corresponding needles, have advanced and formed a loop. This timing is readily obtained by adjusting the set-screws which regulate the movements of the two cam-rings.

By the use of my invention the fabric is not only automatically held down during the entire time it is being formed, but the machine is also adapted to be combined with the mechanism usually employed for automatically regulating the operation of knitting-machines while forming the heels and other irregular portions of hosiery.

It will be noticed that the loopers are retracted by their actuating-cam, so their acting ends are outside the needles, while the holders receive a shorter stroke, as they do not need to be drawn entirely outside the needles; also, that the loopers are located in a plane higher than that of the holders and have no rising movement, so that they cannot get in the way or interfere in any manner with the formation of the loops.

I claim—

1. The combination in a knitting-machine, with the needles, of a yarn-guide for delivering a stitch-thread to the needles, movable loopers adapted to be projected inward beyond the needles, means for actuating said loopers and holding them, with the loop-thread, in their inward position during the formation of stitches in the stitch-thread, a yarn-guide for delivering a loop-thread to the loopers, movable holders independent of the loopers for holding the fabric down, and means for actuating the holders separately from the loopers.

2. A knitting-machine for producing looped fabric comprising the combination of the needles, radially-sliding loopers for forming the loops, radially-sliding holders independent of the loopers, mechanism for operating said loopers and holders separately, and means for supplying independent threads to the needles and to the loopers.

FREDERICK C. REHM.

Witnesses:

EDWARD S. EVARTS,

H. M. MUNDAY.