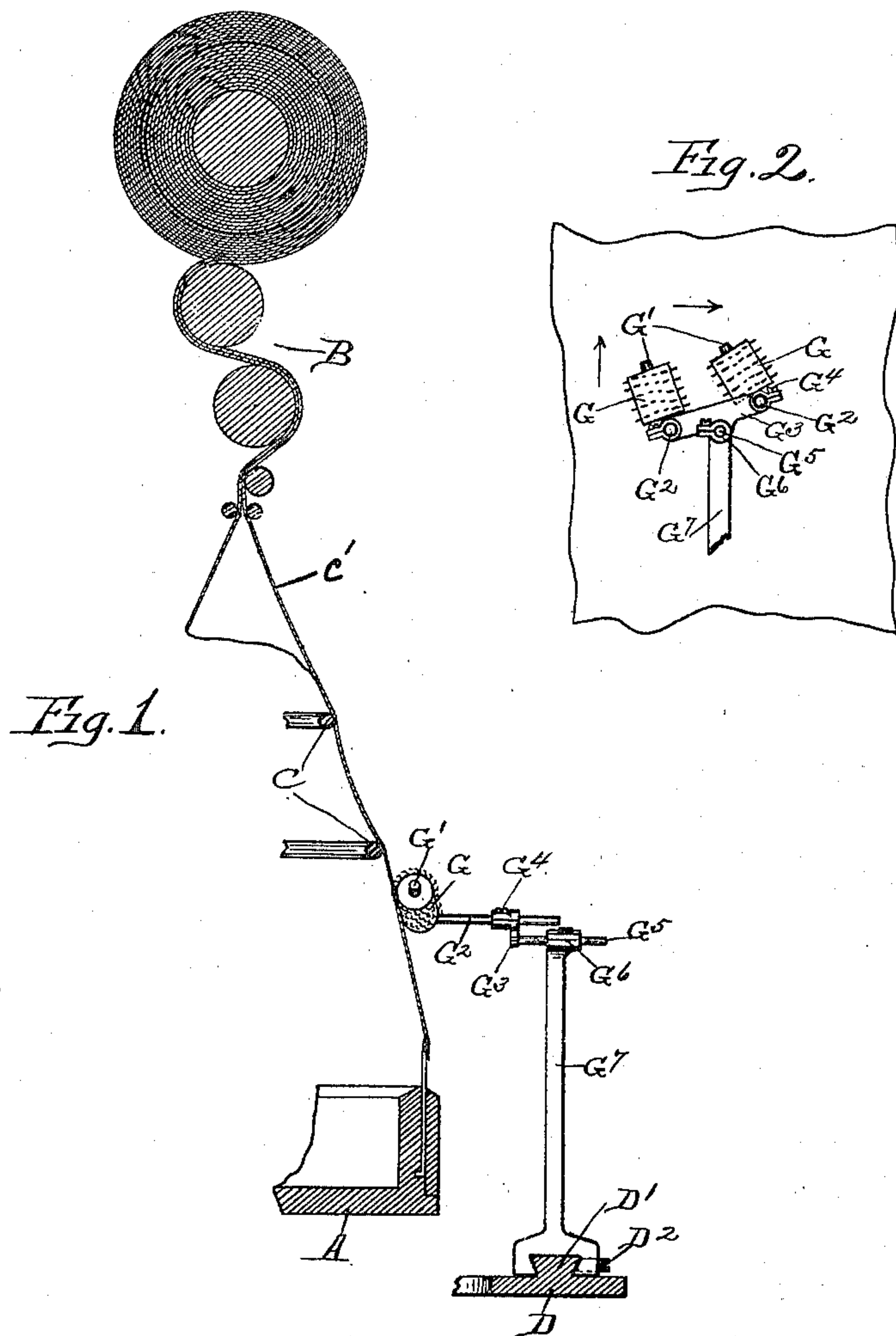


(No Model.)

C. M. MUSGROVE.
CLOTH NAPPING MECHANISM.

No. 600,885.

Patented Mar. 22, 1898.



Witnesses:
G. H. Curtis.
J. G. Curtis.

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UNITED STATES PATENT OFFICE.

CHARLES M. MUSGROVE, OF PITTSFIELD, MASSACHUSETTS.

CLOTH-NAPPING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 600,885, dated March 22, 1898.

Application filed June 29, 1897. Serial No. 642,782. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. MUSGROVE, a citizen of the United States, residing at Pittsfield, county of Berkshire, and State of Massachusetts, have invented certain new and useful Improvements in Cloth-Napping Mechanism, of which the following is a specification.

The invention relates to such improvements; and it consists in the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in both views.

Figure 1 of the drawings is a vertical cross-section of the cylinder, feed-circle, and take-up mechanism of a common form of a circular-knitting machine, showing my invention applied thereto. Fig. 2 is a view in side elevation of the napping-rolls and a portion of their supporting mechanism.

The principal object of my invention is to provide a simple and effective mechanism for producing or forming a nap or fleece upon the surface of knitted fabric, whereby the napping operation may proceed simultaneously with the knitting operation.

Referring to the drawings, A represents the cylinder of a common form of circular-knitting machine, and B the take-up mechanism, intermediately of which are the fabric guiding and spreading rings C. C' represents the fabric. These parts are common to many styles of circular-knitting machines—as, for example, the Tompkins upright rotary knitting-machine, described at page 221, volume 2, of *Appleton's Cyclopaedia of Applied Mechanics*. In such machines the needle-cylinder and take-up mechanisms are rotated simultaneously and upon a common axis by means of gears. The construction and operation of such machines being well understood, I have omitted from the drawings the gear mechanism for rotating the cylinder and take-up and have shown only a part of the cylinder and take-up rolls. The construction of these parts is immaterial for the purposes of this invention so long as said parts are adapt-

ed to rotate in unison and upon a common axis, so as to impart to the knitted web a rotary movement as it passes from the cylinder to the take-up.

D is the feed-circle, which supports the several feed-stands, the latter being omitted from the drawings.

My improvement comprises a napping-roll rotary upon a fixed support and upon an inclined axis in the path of the knitted fabric intermediately of the cylinder and take-up mechanism.

G is a napping-roll, which may be any desired cylindrical body provided with a covering of card-clothing. The roll is loosely mounted upon the spindle G' to rotate freely thereon, the spindle being provided with a horizontal shank G², rotatively adjustable in bearings in the supporting plate or bar G³, wherein it can be locked in adjusted position by means of the screw G⁴, which clamps the members of the split bearing upon the inclined shank. The plate G³ is also provided with a shank G⁵, adjustably secured in a similar manner in the bearing G⁶ in the upper end of the standard G⁷. The bottom of the standard is provided with a dovetailed recess adapted to receive the similarly-formed flange D' on the feed-circle. The standard can be moved along the flange and located at any desired point thereon by means of the set-screw D² in the same manner as the feed-stands are commonly secured in position.

In adjusting my attachment for use the shanks G² and G³ of the roll-supporting spindle and bearing-plate are, one or both, adjusted longitudinally in their bearings until the card-teeth on the napping-roll extend across the path traversed by the fabric in passing from the cylinder to the take-up mechanism in position to be engaged by the fabric, whereby a rotary movement will be imparted to the roll on its spindle by the rotary movement of the web of fabric.

In addition to the longitudinal adjustment of the shank of the napping-roll spindle in its bearing the shank is rotated therein until the spindle assumes a position diagonal to the axis of rotation of the web of fabric such that the card-teeth are caused to traverse an upward and downward path as the roll rotates.

The variation in vertical position of the

teeth, due to the inclination of the roll-spindle, causes the teeth as the roll is rotated by engagement with the rotating cloth to strain and pull upon the surface fibers of the fabric in a direction at right angles to the direction of movement of the rotating fabric, thereby producing upon such surface a nap or fleece which gives a soft and finished effect to the fabric.

By varying the inclination of the roll-axis the vertical throw of the card-teeth can be varied, as desired, to produce a longer or shorter nap to meet varying requirements.

The napping-roll spindle may be supported in a fixed position in any known manner, so that the roll can operate upon either side of the fabric, as desired.

I have shown two napping-rolls in Fig. 2 with their spindles at varying degrees of inclination and arranged so that the card-teeth will act successively upon the fabric, whereby the fibers can be more gradually drawn out or stretched and with less liability of breaking the fibers than would be the case where a single roll is employed.

My improved mechanism is entirely automatic in its operation, requiring no special belts, pulleys, or other driving-gear, and is easily renewed or readjusted.

The napping-roll may be provided in any known manner with a toothed or roughened surface adapted to raise a nap on the engaged cloth.

It is characteristic of my invention that the napping-roll is rotated only by contact with the rotating web of fabric and that the strain upon the fibers to form the nap is not in the direction of the rotary movement of the fabric and roll, but transversely thereto, and that

such strain is dependent entirely upon the vertical throw of the card-teeth while in engagement with the fabric. The strain upon the fibers is thus limited and determined by the degree of inclination of the roll-axis, and the fibers which form the nap are merely drawn out and not ruptured or broken, as is the case where a non-rotary napping device is employed or where the napping device is provided with positive driving mechanism.

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

1. The combination with the rotary cylinder and take-up mechanism of a circular-knitting machine adapted to support and rotate a web of knitted fabric, of a napping-roll rotatively supported upon an inclined axis in the path of the knitted web intermediately of the cylinder and take-up mechanism and adapted to be rotated only by contact with the rotating web of fabric, substantially as and for the purpose set forth.

2. The combination with the rotary cylinder and take-up mechanism of a circular-knitting machine, of a support, a spindle adjustably mounted thereon, means for adjusting the spindle upon its support, whereby its angular position relatively to the axis of rotation of said mechanism may be varied; and a napping-roll rotatory upon said spindle in the path of the knitted fabric intermediately of said cylinder and take-up mechanism, substantially as described.

In testimony whereof I have hereunto set my hand this 19th day of June, 1897.

CHARLES M. MUSGROVE.

Witnesses:

FERD T. FRANCIS,
E. A. CLARK.