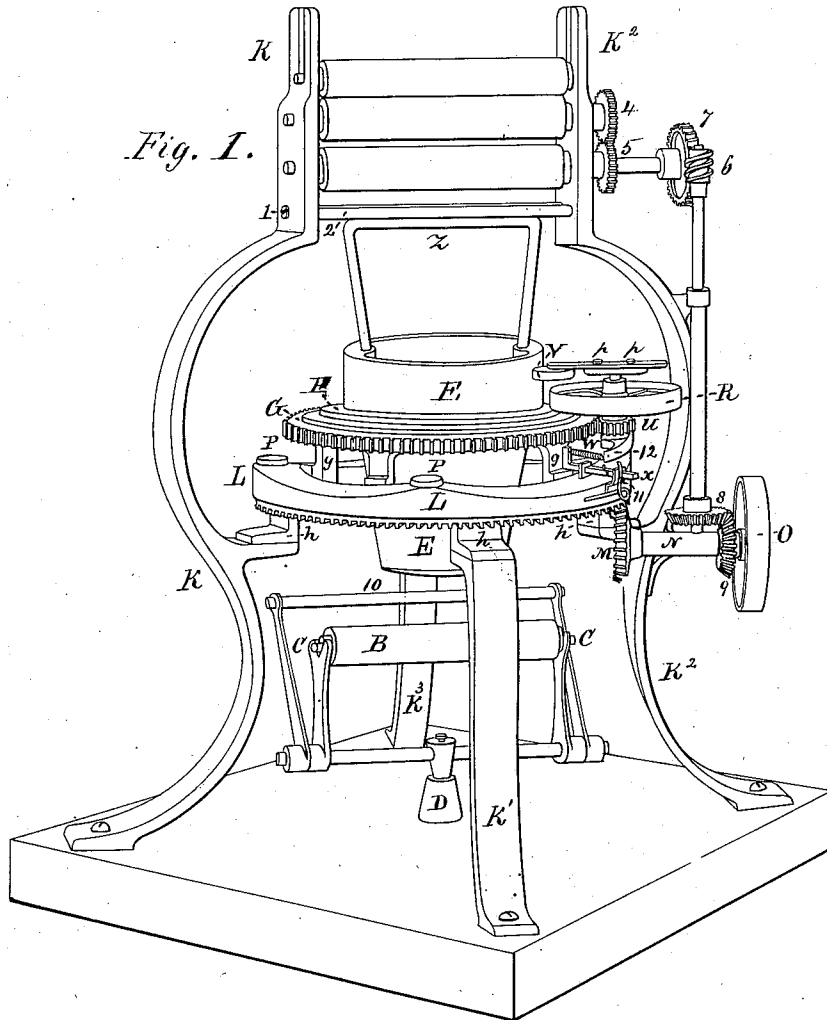


C. TOMPKINS & I. TOMPKINS.

Machines for Napping, Brushing, &c., Tubular
Knitted Fabrics.

No. 140,320.

Patented June 24, 1873.



WITNESSES

E. A. Eliot
Philip O'Reilly

Clark Tompkins
Ira Tompkins

INVENTORS

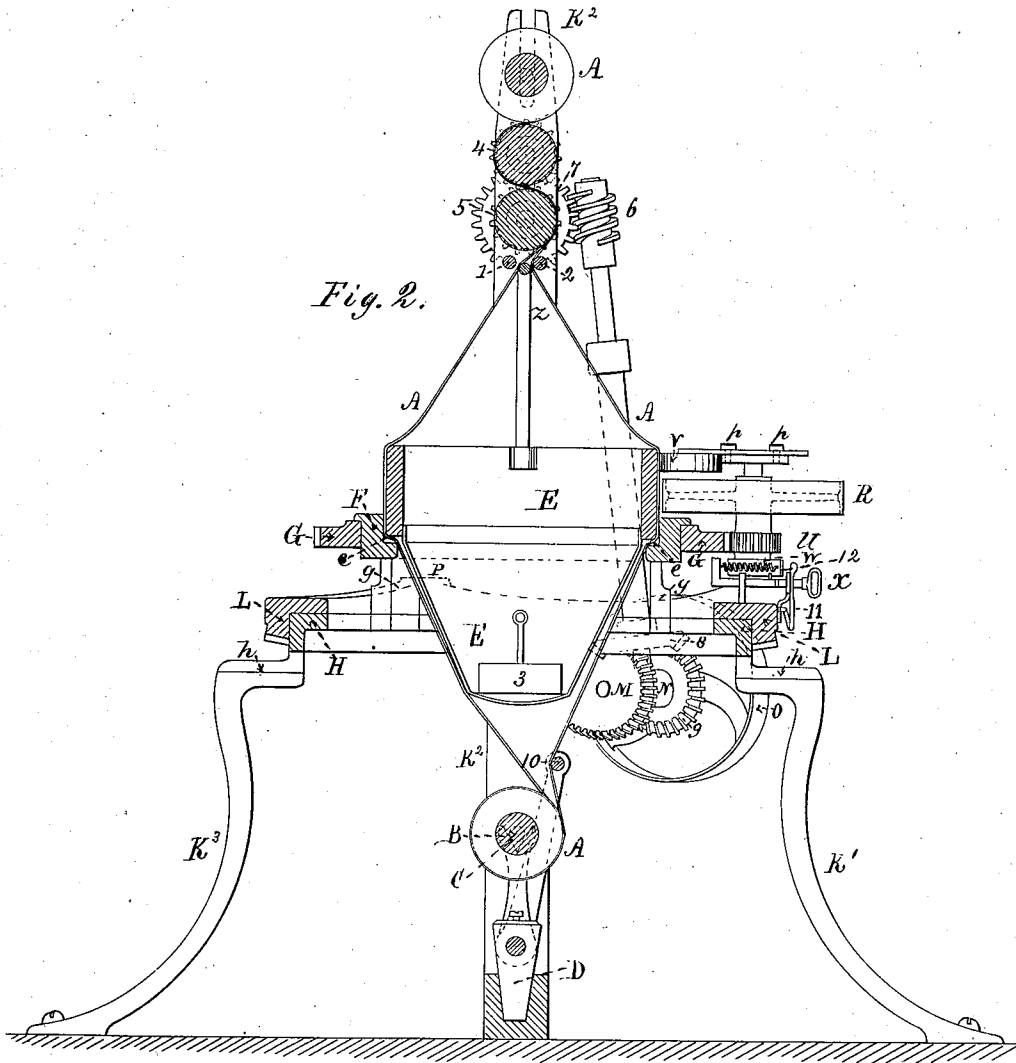
By Boyd Eliot
att'y

C. TOMPKINS & I. TOMPKINS.

Machines for Napping, Brushing, &c., Tubular
Knitted Fabrics.

No. 140,320.

Patented June 24, 1873.



WITNESSES

E. Eliot
Philip O'Reilly

Clark Tompkins
Ira Tompkins
By Boyd Elliot attn

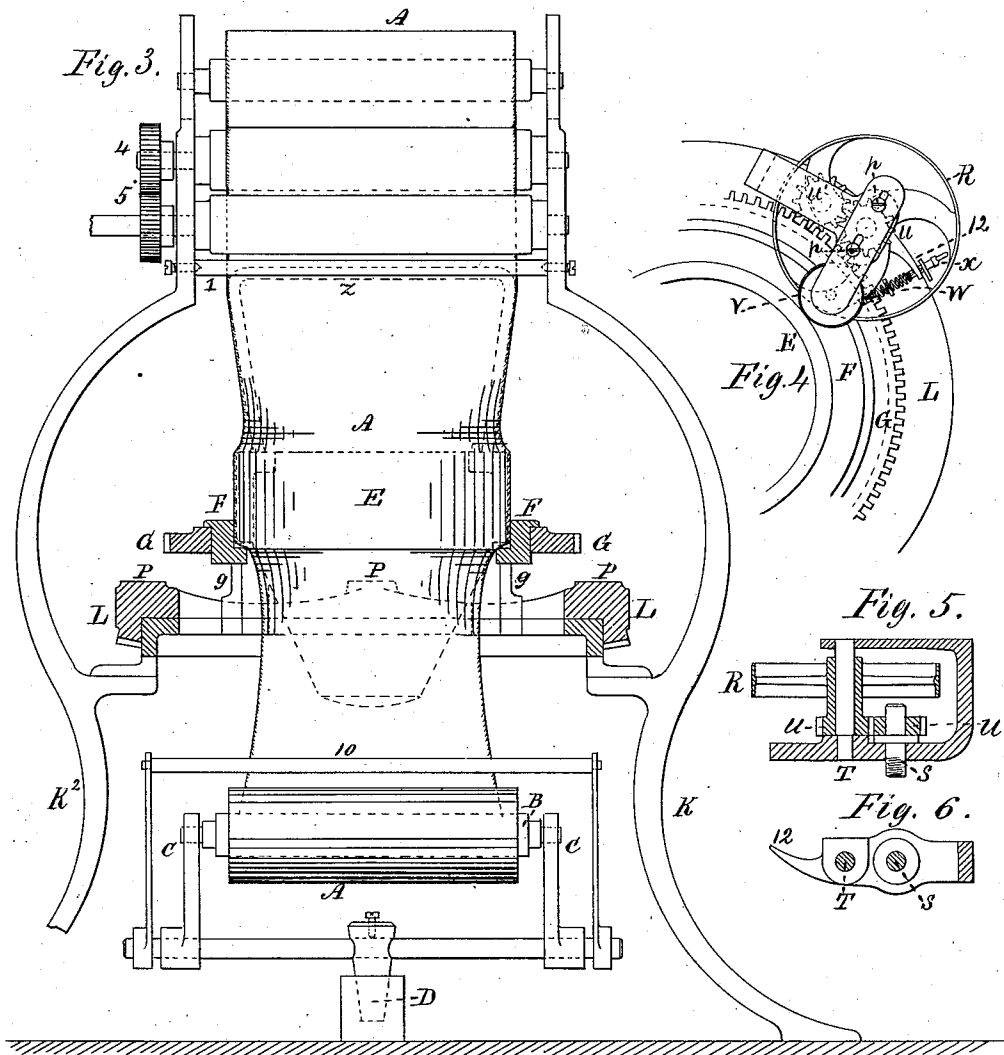
INVENTORS

C. TOMPKINS & I. TOMPKINS.

Machines for Napping, Brushing, &c., Tubular
Knitted Fabrics.

No. 140,320.

Patented June 24, 1873.



WITNESSES.

E. Eliot
Philip O'Reilly

Clark Tompkins

Wm Tompkins

By Boyd Eliot atty

INVENTORS

UNITED STATES PATENT OFFICE.

CLARK TOMPKINS AND IRA TOMPKINS, OF TROY, NEW YORK.

IMPROVEMENT IN MACHINES FOR NAPPING, BRUSHING, &c., TUBULAR-KNITTED FABRICS.

Specification forming part of Letters Patent No. **140,320**, dated June 24, 1873; application filed February 7, 1872.

To all whom it may concern:

Be it known that we, CLARK TOMPKINS and IRA TOMPKINS, both of Troy, in the county of Rensselaer and State of New York, have invented certain Improvements in Machines for Napping, Brushing, and Finishing Tubular-Knitted Fabrics, of which the following is a specification:

This invention has for its object chiefly, first, the returning of tubular-knitted fabrics into perfect shape after the process of scouring or washing and drying, to which such material is subjected while in the web or piece; second, the napping and brushing of such fabrics automatically, and in such a manner as to finish them ready to be made into garments or wearing apparel.

In order that the capacities of such a machine may be properly understood, it may here be remarked that when the web comes from the knitting machine it contains a great deal of grease which has been applied for the operation of carding and spinning, and some dirt which accumulates during the same process, as well as that of knitting, both of which elements require that the web shall be subjected to a thorough scouring or washing and drying before it is fit to be formed into garments.

Such an operation of necessity draws and warps or twists the fabric into a great variety of irregular shapes, and to such a degree that if not properly restored, so that a section across the web would be as nearly as possible on the same thread, the commercial value of the fabric would be greatly impaired. Again, there are in all such fabrics great numbers of motes, or specks, atoms of leaves, burrs, &c., that become incorporated with the yarn in the process of spinning, and which still adhere to the web, but can generally be removed by a thorough brushing with very stiff brushes, which will also raise a "nap" or soft finish when properly done either by hand or machinery.

The invention herein set forth covers completely all these difficulties and delivers the web in a nicely-formed roll, in better shape, and with much greater rapidity than can be done by hand, and requiring but little attention and no skilled labor.

Figure 1, Sheet 1, is a perspective view of

the machine. Fig. 2, Sheet 2, is a vertical section of the same at a right angle to the right-face view in Fig. 1. Fig. 3, Sheet 2, is a partial section and an elevation of the machine at a right angle to Fig. 2. Figs. 4, 5 and 6 are views of some of the parts in detail, as will be hereafter explained.

The tubular web or knitted fabric A, after being dried, is wound upon a roller, B, supported horizontally in suitable bearings C, which rest in a vertical step underneath the machine, as at D, so that the web may be permitted to move freely in every direction. The outer end of said web is carried up and around a conical-shaped spreader, E, which is inverted into the web, and is of sufficient size to stretch the fabric rather tightly over it, whence it is conducted by suitable guides up to the take-up or winding rolls at the top of the machine. Surrounding the conical spreader E there is a metal ring or hoop, F, provided with an angular recess, *e*, Figs. 2 and 3, within which the web and the spreader E are suspended. Said ring F is suspended by a flange on its outer edge within a corresponding circular frame, G, which is mounted upon suitable supports *g g* connected with the frame of the machine. The frame of the machine consists of a circular rim of metal, H, cast with a vertical flange projecting downward, and upon which at suitable points, as at *h*, brackets are formed like feet, which extend out to four pedestals, K, K¹, K², and K³, the lower ends of which rest upon the floor and support the working-parts of the machine. Two of said pedestals, as K and K², extend upward from the brackets *h*, as shown in the drawings, to support the take-up mechanism, and the roll or web after it is finished. Upon and around the circular frame H is mounted a ring-disk, L, the cross-section of which is a right angle, and upon the vertical flange of which are teeth that engage with a pinion, M, upon the driving-shaft N, to which motion is given by a belt upon the pulley O. At suitable points, as at P, upon the upper face of said ring-disk L, bosses are formed, upon which the napping and brushing apparatus is mounted, and is carried around the exterior surface of the web as the ring-disk L revolves. The napping and brushing agent consists simply of a wheel, R, clothed with straight wire teeth or bristles; and said wheel

is mounted upon a vertical axis supported in a frame or bearings, one point of which is pivoted upon the bosses P upon the disk L. A top view of one of said napping-brushes is shown at Fig. 4, and a vertical and longitudinal section of the same is seen at Fig. 5, where is also seen the screw-stud S that supports the frame and its napping-brush upon the bosses P of the disk L. The bottom portion of the brush-frame, as shown at Fig. 5, is shown in plan at Fig. 6, and it will be seen that, as the brush-frame is pivoted upon one of the bosses P, at a point some distance from the axis of the brush, as seen at T, said brush with its brush-frame can oscillate to and from the web. On the upper end of stud S is a pinion, U', which engages with teeth upon the stationary ring G, and a pinion, U, on the brush-axle, and, consequently, as the brush and its frame are carried around on the ring-disk L, a rotary motion is given to the brush, in the same manner as a planet-wheel. At V a gage-wheel is attached to the brush-frame by set-screws *p p* through slots, so as to regulate the proximity of the brushes to the web, said gage or guide-wheel V being constantly pressed toward the web by a spring, W, one end of which is attached to the brush-frame, and the other to the inner end of a shipping-bar, X, which, when forced inward, keeps the spring W always sufficiently taut to hold the brushes as close to the fabric as the gage-wheel will permit.

As shown in the drawings, all that portion of the base of the spreader E above the angle *e* in ring F is cylindrical, consequently the fabric or web, in being drawn upward over said cylinder, will present a smooth cylindrical surface to the brushes as they are carried around on the disk L. At two opposite points upon the top of said spreader E a spreading-guide, Z, is attached, said guide being formed of a rod or wire bent at less than right angles from two points of the center, which two points shall be as far apart as the web is to be stretched before it passes to the finished roll, and the ends of said guide, extending downward, are attached by nuts to the top of the spreader E, while the middle or horizontal portion reaches up to and between two rods, 1 and 2, that reach across between the uprights K to K², and serve as tie-rods to the upper part of the frame, as well as compressing-guides to flatten the tubular web in its passage to the finished roll. Said spreading-guide Z also serves, in combination with the rods 1 and 2, as a guide or steadying agent to the conical spreader E, tending to keep it always in a vertical position in the tubular web, and also to prevent its rising with the web in case its own weight, or the extra weight, as at 3 of Fig. 2, should not be sufficient to overcome the friction or lifting action of the web upon it.

It is preferred to make the conical end of the spreader E of a rounded form rather than pointed, so that, as the web is drawn up over

it, it will not be caught in any holes in the knitted fabric, such as occur at times from dropped stitches or broken threads.

Said spreader E and its guiding-bail Z, as also the ring F, may all be changed from time to time, as occasion may require, to adapt them to the various sizes of the knitted fabrics, the usual dimensions being from about seventeen to twenty-seven inches in width when double, or when the tube is flattened or spread out.

The take-up or moving agent for the web consists of two roughened or emery-faced rollers, mounted in suitable bearings near the top of the machine, as shown in the drawings, and between which the web is drawn from between the two-guide rods 1 and 2. Said take-up rolls have a positive and synchronous motion given to them by their pinions 4 and 5 and the worm and wheel 6 and 7, said worm being driven by a bevel-wheel, 8, which engages with a similar wheel, 9, on the first driver at N, and as the web is drawn up by said rolls 4 and 5 it winds around the core-roll that is held in the slots at the top of the frame, and which rises in said slots as the roll is increased.

It has been found most convenient to use four brushing-wheels in the same machine, as there is room enough for the four to be mounted on the ring-disk L, and to operate at the same time upon the goods; but, to prevent the web from being swept around on the spreader E into a kind of spiral shape, two of said brushes are arranged to run in an opposite direction to the other two, so that the sweeping action of one pair will counteract the sweeping action of the others. This opposite motion is easily accomplished by the use of an intermediate pinion between the brush-pinion U and its driver U' in the brush-frame.

At 10, and just above the roll B, upon which the web is first wound, there is arranged a guide-rod or horizontal bar, which serves to press against the slack side of the web as it passes to the spreader, so that when the fabric reaches the cylindrical part of the spreader it will be returned to its original shape, or as when it came from the knitting-machine—that is, the threads will be substantially at right angles to the axis of the tubular web, and all the loops in direct lines longitudinally.

The napping-brushes may be thrown in and out of action upon the goods by the shipping-bar X, which is mounted on the disk L, and under the swinging end of the brush-frame, and which is held in working-position by a spring-stop, 11, in one of two notches upon its edge, as shown in the drawings. When said bar, upon which is a retaining-pin, is shoved inward toward the web it allows the spring W to force the brush against the fabric, but when said bar is drawn outward the spring W is slackened, and the brush and brush-frame are drawn back from the goods

by the pin on said bar coming in contact with the inner face of the brush-frame, or that portion marked 12 in Figs. 2, 4, and 6.

We claim—

1. The gravitating or weighted spreader E, arranged below the cloth-supporting roller, and the take-up rollers, and over which the tubular-knitted fabric is straightened, as described.

2. The combination of a rotating and traveling brush or brushes with a conical spreader having a cylindrical base, as described, and for the purposes set forth.

3. The conical gravitating or weighted spreader E, arranged between the cloth-supporting and take-up rollers, and combined with a recessed ring for stretching the knitted fabric and holding it taut during the process of brushing, as described.

4. The guide-rod 10 in combination with the conical spreader, as described, and for the purposes set forth.

5. The combination of the brush-frame with the ring-disk L, whereby the brush is carried around the tubular-web, as described, and for the purposes set forth.

6. The combination of the brush-frame pinions U' and U with the stationary disk G and revolving disk L, whereby the brush receives a rotary motion, as described, and for the purposes set forth.

7. The combination, with the brush-frame, of the adjustable guide-wheel V and spring W, whereby the action of the brush upon the fabric is controlled, as described, and for the purposes set forth.

8. The combination of a shipping-bar, X, spring W, and stop 11, with the brush-frame, as described, and for the purposes set forth.

9. The combination of the guiding-bail Z, rods 1 and 2, and weight 3, when it may be desired, with the conical spreader E, for resisting the friction of the fabric, as described, and for the purposes set forth.

CLARK TOMPKINS.
IRA TOMPKINS.

Witnesses:

J. S. ADAMS,
EDW. BALE,
A. N. BELCHER,
G. F. SIMS.