(No Model.)

T. H. WORRALL.

NEEDLE CYLINDER FOR KNITTING MACHINES.

No. 381,197. Patented Apr. 17, 1888.

Fig. 1.

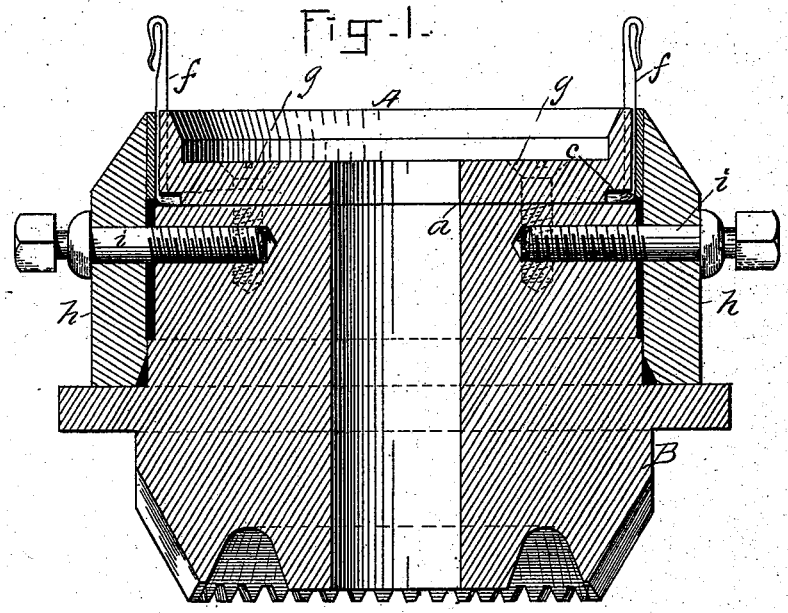
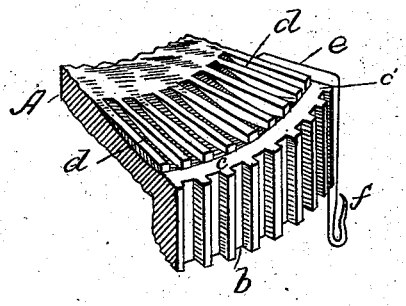


Fig. 2.



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UNITED STATES PATENT OFFICE.

THOMAS H. WORRALL, OF LACONIA, NEW HAMPSHIRE.

NEEDLE-CYLINDER FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 381,197, dated April 17, 1888.

Application filed June 17, 1887. Serial No. 241,608. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. WORRALL, of Laconia, in the county of Belknap and State of New Hampshire, have invented certain new and useful Improvements in Needle-Cylinders for Knitting-Machines, of which the following is a specification.

My invention relates to needle-cylinders for circular-knitting machines of the class commonly known as "trick-cylinders," and comprises improvements on the invention shown and described in Patent No. 348,088, granted to me August 24, 1886. In said patent I have shown the sides of the main cylinder provided with vertical grooves and the top of the body-ring tricked or grooved, the needle-shanks being clamped between two plane surfaces of the main cylinder and body-ring and sustained laterally by the sides of the said radial grooves formed in the top of the body-ring. The needle-cylinder in the construction shown in said patent is formed in three parts—viz., the base, the body-ring, and main cylinder. While this form of cylinder completely answers the purposes set forth in said patent, it has in practice two slight objections: First, being made in three parts, it is unnecessarily expensive of manufacture; and, second, the cylinder is not readily changed from one gage of work to another—that is, from finer to coarser. These objections are entirely overcome by my present improvements, which consist in forming the cylinder in but two parts, the body or base cylinder and the top cylinder, the former having its top or upper surface formed plain and the latter having vertical grooves formed in its periphery, a plain groove being made in its lower outer edge and radial tricks or grooves formed in its under surface extending from the said groove in its lower outer edge inward, said radial grooves being made of a width corresponding to the diameter of the needle-shanks, and preferably of slightly-greater depth than said shanks, so that the hold on the needle-shanks vertically may be confined entirely to the point between the upper plain surface of the body or base cylinder and the lower plain surface of the groove made in the lower outer edge of the top cylinder, the sides of the radial tricks or grooves serving merely as a lateral support for the needle shanks, and the vertical peripheral grooves for maintaining the stems of the needles in proper vertical position. In this way the needles may be firmly held at a uniform height and the cylinder changed with great facility, so as to adapt the machine to perform work of different gage or degrees of fineness.

I will now proceed to describe my invention, so that others skilled in the art may be able to make and use the same.

Reference is to be had to the accompanying drawings, and to the letters of reference marked thereon, forming a part of this specification, the same letters indicating the same parts in both views.

Of the drawings, Figure 1 represents a vertical section of a needle-cylinder embodying my invention, a needle being shown in position on each side. Fig. 2 represents a fragment of the top or main cylinder in reverse or upside-down position, showing a needle in place.

In carrying out my invention I prefer to construct the cylinder in two parts, consisting of the body or base cylinder B, having a plain upper surface, *a*, and a top cylinder, A, provided on its periphery with vertical grooves *b*, and having a circumferential groove, *c*, formed at its lower outer edge, the upper surface, *c'*, of which groove is plain or flat, as shown. From said circumferential groove inward toward the center the top cylinder is tricked or radially grooved, as represented at *d*, said last-mentioned grooves being equal in number to the vertical grooves *b*, of a width corresponding to the diameter of the needle-shanks *e*, and of a depth preferably greater than said needle-shanks, so that when the needles *f* are placed therein, as portrayed in the drawings, the shanks will be held vertically entirely between the upper plain surface of the body or base ring and the surface *c'* of the circumferential groove formed in the top cylinder, the sides of the radial grooves *d* serving merely as lateral supports for the needle-shanks. In this way the needles will be held with absolute "truth" at a uniform height between the upper face of the body or base cylinder and the face *c'* of the circumferential groove formed in the outer edge of the top cylinder, and all that is necessary to change the cylinder to adapt it

to different gages or grades of work is to substitute for the top cylinder in use a top cylinder of different gage of vertical grooves *b* and radial tricks *d*, changing also, if need be, the "number" of the needles. The top cylinder is secured to the body or base cylinder by screws *g*, and the stems of the needles are clamped in the vertical grooves *b* by the usual clamping-sections, *h*, and screws *i*.

By the construction and combination of parts hereinbefore described I obtain all the advantages set forth in my patent referred to, and confine all of the tricking and grooving to a single part—the top or main cylinder—which results in a saving in the expense of constructing the cylinder and renders it readily convertible to different gages, so as to enable the machine to perform work of different grades of fineness.

Having thus set forth the nature and objects of my invention and the manner of constructing and using the same, what I claim is—

1. A knitting-machine cylinder consisting of a base or body cylinder, B, and a removable top cylinder, A, the latter provided with a circumferential groove at its lower outer edge, and radial tricks or grooves *d*, formed in its lower surface, extending from said circumferential groove inward, substantially as and for the purposes described.

2. A knitting-machine cylinder consisting of a base or body cylinder, B, having a plain upper surface, and a removable top cylinder, A, the latter provided with a circumferential groove at its lower outer edge, and radial tricks or grooves *d*, formed in its lower surface, of a width corresponding to the diameter of the needle-shanks and of greater depth than the same, and vertical peripheral grooves *b*, in combination with the needles and clamping-sections, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 6th day of June, A. D. 1887.

THOMAS H. WORRALL.

Witnesses:
FRED L. SMITH,
FRED K. SANBORN.