

UNITED STATES PATENT OFFICE.

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YARN FORMED OF FIBROUS MATERIALS.

SPECIFICATION forming part of Letters Patent No. 763,377, dated June 28, 1904.

Application filed December 13, 1902. Serial No. 135,157. (Specimens.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY DRURY, a citizen of the United States, residing in Waltham, in the county of Middlesex and State of Massachusetts, have invented a new and useful Yarn Formed of Fibrous Materials, of which the following is a specification.

My invention consists of a new kind of yarn, which I term "core-yarn," and which is adapted to be used, like other yarns, in the manufacture of woven, knitted, braided, and wound goods, thread, twine, rope, and other cordage, and the like.

By "core-yarn" I intend yarn having the external characteristics of a single strand of spun yarn, but composed of a core and an exterior portion distinct from each other in their spinning, the exterior being spun upon and around the previously-spun core and the two being uniformly concentric with each other in cross-section in the sense that the core is evenly surrounded by the exterior portion, the fibers which compose the exterior of the yarn enveloping and lying evenly around the core and covering the latter from external view. It is preferred that the core should be two-ply, composed of strands whose twist individually is opposite that of the exterior, and that these strands be slackly twisted together. The core, however, may consist of a single strand only or of more than two strands. The individual twist of the strand or strands may be in the same direction as that of the exterior, if preferred, and if more than one strand be used for the core they may, instead of being slackly twisted together, be twisted together hard or not at all.

There are many fibrous materials which it is impracticable to spin into ordinary yarn, but which can successfully be used for the exterior of yarn of the present invention with a strong separately-spun core—as, for example, the shearings of napped cloth and fibrilated leather, whether mixed with other fiber or not.

Core-yarn may be of great variety. For illustration, its central core may be of cotton yarn while its exterior may be wool, or a like core may be surrounded by fibers of cotton, cotton-waste, silk-noils, flax-waste,

asbestos, fibrous peat, or other fibers. The central core may be of jute or other yarn and the exterior of wool or other fibers.

By the use of core-yarn it is easy to effectively combine in a single article the qualities of unlike fibrous materials—as, for example, a woven horse-blanket composed of the yarn of my invention, with jute yarn for its core and wool for its exterior, has two fabrics in one, so incorporated with each other that it has all the qualities of a woven woolen blanket and, in addition thereto, actually has for its foundation and greatest strength an interior burlap. So, too, toweling composed, for instance, of core-yarn having a cotton core and linen exterior absorbs as readily as one wholly of linen and dries off sooner, having really two fabrics in one. Examples might be multiplied; but the above will answer the purpose.

It remains now to explain how the yarn of the present invention is or may be made. In my application filed November 2, 1903, Serial No. 179,631, on which Letters Patent will issue of even date herewith, I have fully described and illustrated the machinery which I now prefer to use for the purpose. It is sufficient to say here that in my Letters Patent No. 611,109, dated September 20, 1898, is described machinery which, with the slight addition of creels to hold the spools containing the previously-spun yarn intended to serve as core and of eyes to guide said yarn across the surface of the doffer-rings, may readily be adapted to make my core-yarn. In a machine of this character which I now have in operation for the above purpose the main cylinder or swift is forty-eight inches wide and forty-eight inches in diameter. It has two ring-doffers, each about twelve inches in diameter and twenty inches apart between their centers, each doffer having twenty-four rings of card-clothing so located that the distance between the middle circumferential line of each ring and that of the next adjacent ring is two inches, each ring being thirteen-sixteenths of an inch wide on its teeth. The rings on the one doffer are opposite to the intervals between the rings on the other doffer. With each of the rings are associated draw-

ing-rolls and a condensing-strap, as provided for in my aforesaid patent. In making a strand of core-yarn on this machine I take a spool of yarn which has been spun by any system, place the same on a conveniently-located creel on which it can freely revolve, and unwind the yarn therefrom, passing it between the meeting faces of the condensing-strap and drawing it while it is being unwound and while the machine is in operation at a uniform rate of speed, usually somewhat slower than the surface speed of the doffer, across the surface of one of the doffer-rings and from one side to the other thereof, so guiding the yarn by eyes suitably held at the sides of such ring that the yarn will barely graze the surface of the ring. While the yarn is being drawn, the part thereof which for the time being grazes the surface of the doffer-ring is made to rotate on its axis with great rapidity by the condensing-strap. The doffer revolves about thirty times per minute, while the main cylinder or swift revolves eighty-five times per minute. As is well known in the art, some fibrous materials admit of running the doffer faster than others. Usually the previously-spun yarn is drawn across the surface of its doffer-ring at the rate of twenty to thirty yards per minute, and usually the part of it grazing the surface of the ring is made to revolve from ten thousand to thirty thousand times per minute, according to the size of the yarn being made and according to the degree of twist desired for the exterior of the yarn. The pulley which drives the condensing-strap is about three and one-half inches in diameter and makes about one hundred revolutions per minute. The meeting faces of the strap move in opposite directions, acting on the yarn drawn between them somewhat in the same manner as the thumb and finger in hand-spinning and causing the part of the previously-spun yarn which grazes the surface of the doffer-ring to revolve very rapidly and gather up the

fibrous material thereon, completely stripping the ring of such material. This material while this process is going on evenly surrounds and envelops the previously-spun yarn, forming an exterior portion which by the action of the meeting faces of the strap, between which it passes, is spun and twisted around the previously-spun yarn as a core. The core-yarn thus produced has all the external characteristics of a single strand of spun yarn. As fast as it is made it is drawn and wound upon a spool. By the machine above outlined forty-eight strands of core-yarn are produced simultaneously.

It is not possible in the drawings to exactly represent the structural characteristics of my core-yarn. The illustration must necessarily be largely diagrammatic and is so in the accompanying drawings, in which—

Figure 1 is an enlarged perspective view, partly in longitudinal axial section, of the yarn; and Fig. 2 is a cross-section of the same.

In the figures, *b* represents the previously-spun core—in this instance a two-ply core composed of two spun strands which are slackly twisted together and whose twist, individually, is opposite to that of the exterior—and *a* is the exterior fibrous envelop uniformly surrounding and spun upon the core.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

Yarn having the external characteristics of a single strand of spun yarn, and composed of a spun core and a fibrous envelop uniformly surrounding, and spun upon, the core, substantially as set forth.

In testimony whereof I have hereunto set my hand this 8th day of December, 1902.

WILLIAM HENRY DRURY.

Witnesses:

HENRY H. FOLSOM,
ABRAM V. MANN.