W. P. WOOD.

YARN.

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928,831.

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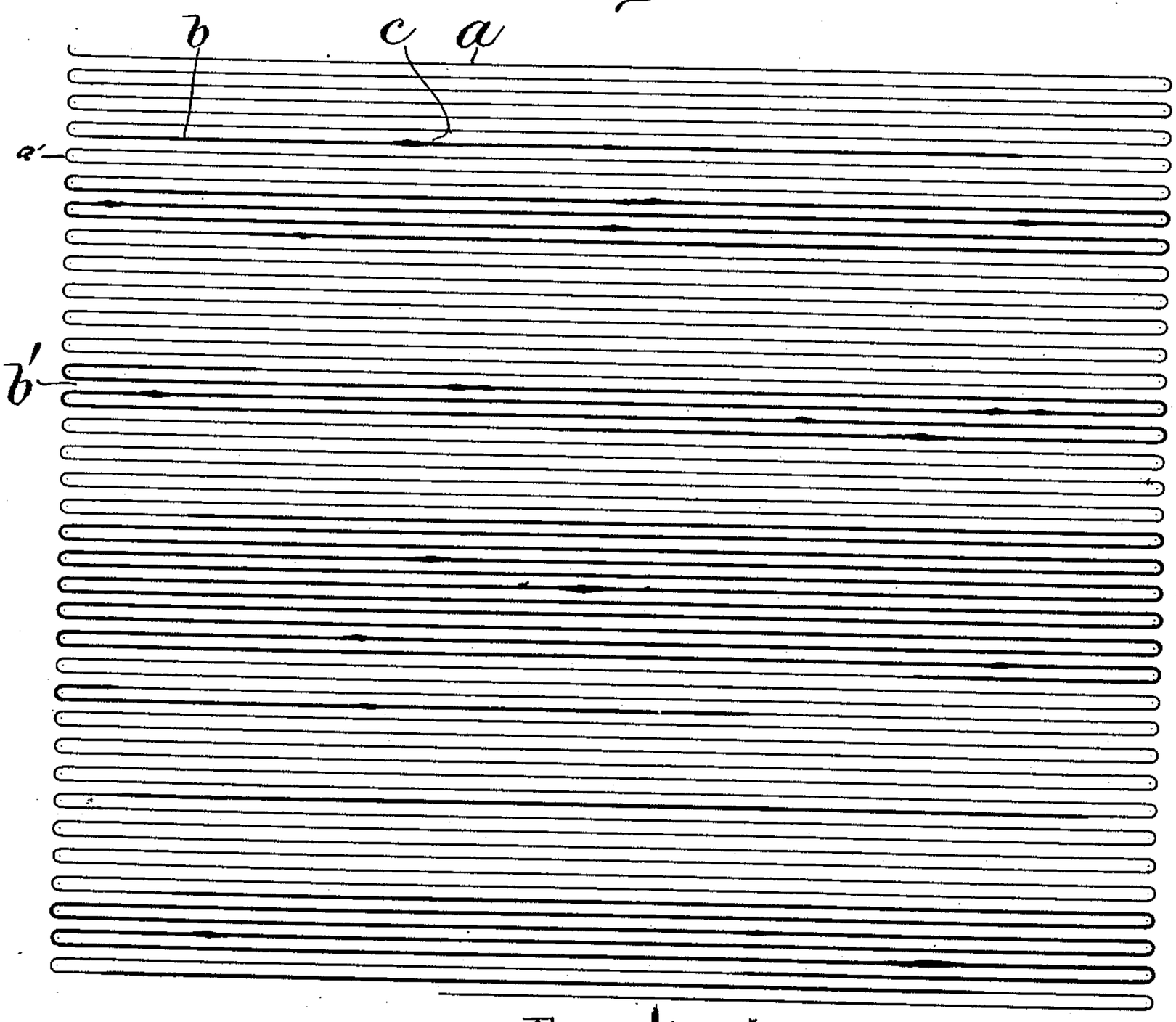
Fig. 1.



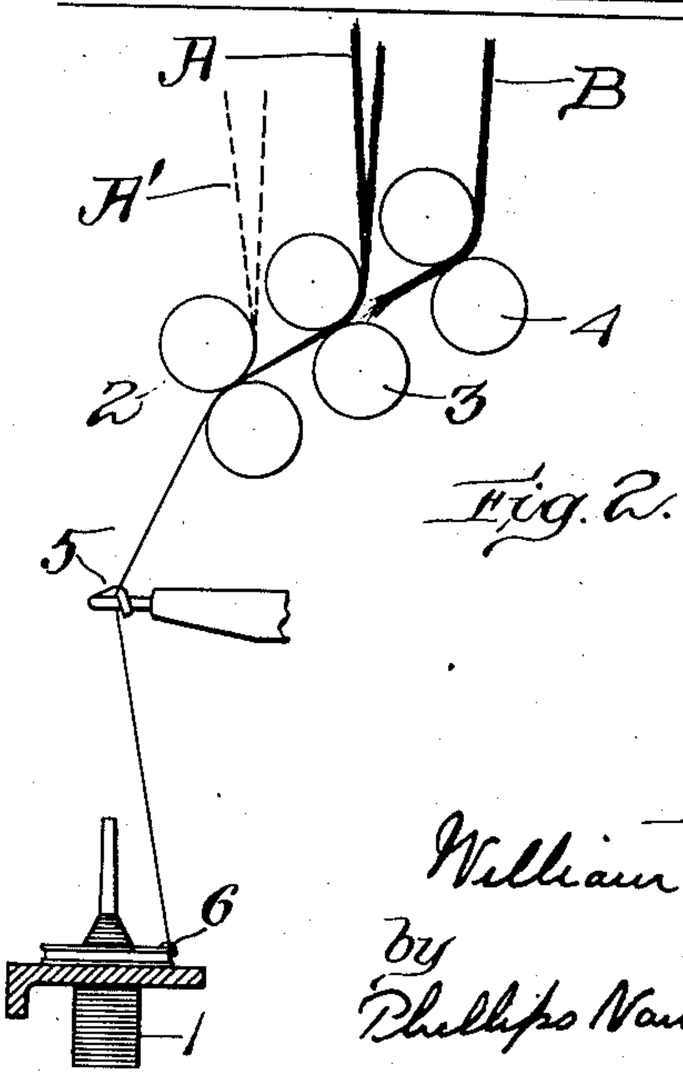


Fig. 2.

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UNITED STATES PATENT OFFICE.

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YARN.

No. 928,831. Specification of Letters Patent. Patented July 20, 1909.

Application filed February 26, 1909. Serial No. 480,154.

To all whom it may concern:

Be it known that I, WILLIAM P. WOOD, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Yarn; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to yarn, and more particularly to spun or twisted yarn adapted for use as filling the warp in the manufacture of woven fabrics.

The object of the invention is to provide a spun or twisted yarn adapted to be used as filling in the manufacture of fabrics having irregular, uneven surfaces, and more particularly to provide a yarn spun from cotton or other fiber which when used as a filling will give to the fabric substantially the rough and uneven appearance which is characteristic of rough pongee fabrics.

Broadly considered, the invention contemplates the provision of a yarn produced by either a spinning, twisting, or combined spinning and twisting operation, in which varying lengths of fine yarn alternate with varying lengths of coarser yarn formed by spinning in additional material. A yarn of this character manufactured from cotton or other fiber may be used as the filling for a woven fabric, and the fine parts and the coarser parts of the yarn may be of such varying length, and be so irregularly distributed along the yarn, that the fabric will have an uneven and irregular appearance somewhat similar to that of rough pongee fabrics. The variations in the length and in the distribution of the different sized portions of the yarn avoid any appearance in the fabric of pattern repeats such as has been the case in attempts to imitate the appearance of rough pongee fabrics. The appearance of the rough pongee fabrics may be more closely reproduced by incorporating noil or bunches at irregular intervals in the yarn, and the provision of such irregularly distributed noil or bunches in a yarn of the character described constitutes a further and more specific feature of the invention, which is not essential to the invention in its broader aspects, but is of importance and advantage in producing a cotton or other yarn for use in reproducing the appearance of rough pongee fabric.

I have found that it is practicable to spin a continuous yarn of varying size, in which the coarser yarn is as much as or even more than double the size of the fine yarn, and to continue the spinning of either fine or coarse yarn for any desired interval during the spinning operation, and that it is therefore practicable to produce yarn embodying the invention by a spinning operation. Such a spun yarn constitutes a further feature of the invention which is of importance and advantage in contributing to the economical production of a yarn embodying the broader features of the invention, and also of advantage in producing a yarn which will enable the appearance of rough pongee fabric to be closely reproduced in a cotton fabric.

In the further explanation of the invention, reference will be made to the illustration in the accompanying drawing.

In the drawings Figure 1 indicates a yarn of two sizes embodying the invention, and diagrammatically illustrates the distribution of the fine and coarser parts of the yarn when woven into a fabric, and Fig. 2 illustrates a spinning or twisting mechanism which may be used in producing the yarn shown in Fig. 1.

The yarn illustrated in Fig. 1 consists of varying lengths *a a'* which are spun or twisted of a predetermined size and alternate with varying lengths *b b'* spun or twisted of a considerably larger size. For instance, there may be several yards of fine yarn, as indicated at *a*, so that the fine yarn extends across the fabric through a number of picks, and this fine yarn may be followed by a length of coarse yarn *b* which may be less or greater than the width of the fabric. The coarse yarn may in turn be succeeded by a fine yarn *a'* of a length to extend through one, two or any number of picks, and this fine yarn may be succeeded by a coarse yarn *b'* which may also be of any predetermined length. Thus the lengths of coarse and fine yarn succeed one another along the yarn at irregularly varying intervals. The use of a yarn of this character,

in which some at least of the fine parts are of sufficient length to extend through a number of picks, as the filling for a woven fabric, will give to the fabric an appearance similar to the appearance of rough pongee fabric.

As shown in Fig. 1, the yarn is not only made up of varying lengths of coarse and fine yarn, but the coarse parts of the yarn are also provided at irregular intervals with short enlargements or bunches *c* which may be formed by incorporating bunches of fiber or noil in the roving from which the yarn is spun. These bunches of noil or other fiber occur at irregular and indeterminate intervals in the yarn, and add to the uneven and rough appearance of the fabric. Similar bunches may be formed at indeterminate intervals in the fine parts of the yarn by using a noil roving in spinning the fine as well as the coarse lengths of the yarn.

Yarn embodying the invention may be produced in any suitable manner, and by any suitable spinning, twisting, or spinning and twisting mechanism. In Fig. 2 I have illustrated diagrammatically one form of mechanism which may be employed in producing the yarn. In this view one of the spindles of a spinning frame is indicated at 1, and the feeding and drawing rolls of the frame are indicated at 2, 3 and 4. The yarn or roving passing through the front drawing rolls 2 passes through the guide 5 and traveler 6, and is wound upon the twisting spindle 1 in the usual manner. In producing a spun yarn of two sizes embodying the invention, the roving A from which the fine yarn is spun is led to the middle rolls 3, and thence to the front drawing rolls 2, and is drawn between the rolls 2 and 3 to give the yarn the desired size. An additional roving B is led through the rear rolls 4, and the front end of the roving rests upon the lower middle roll 3 during the spinning of the fine size portions of the yarn, the rolls 4 during the spinning of these portions of the yarn being held stationary, so that the roving B is not delivered to the drawing rolls. The rolls 4 are rotated at predetermined and varying intervals, and when rotated, continue in rotation for varying lengths of time. During the periods when the rolls 4 are rotated, the roving B is fed to the middle rolls 3 with the roving A, and thus increases the size of the roving drawn between the rolls 2 and the rolls 3, and correspondingly increases the size of the yarn being spun during this interval. When the rotation of the rolls 4 is arrested, the roving B is drawn apart at the bight of the rolls 3, so that the size of the yarn being spun is decreased, and a fine yarn is spun during the interval that the rolls 4 remain stationary.

Plain roving of uniform size may be fed to the rolls 3 and 4 in which case yarn will be spun in which the fine and coarser lengths are of predetermined and uniform size, as well as of predetermined varying lengths. By feeding a noil roving to the rolls 3, or to the rolls 3 and 4, a yarn may be spun in which bunches or short enlargements of indeterminate size will occur at indeterminate intervals in both the fine and coarser lengths of yarn. If noil roving is delivered to the rolls 4 only, then the bunches will occur in the larger size lengths only. Similar mechanism may be used in spinning a roving made up of varying lengths of different size, and this roving may be spun into a yarn embodying the invention by an ordinary spinning frame or mule.

A twisted yarn may be produced by leading yarns A′ to the front rolls 2, and a roving A or B to the middle rolls 3. In this case the rolls 3 should be intermittently rotated at irregular intervals in the same manner as indicated with reference to the rolls 4. With the mechanism thus arranged, a fine yarn of predetermined size will be formed by the twisting together of the yarns A′ during the periods when the rolls 3 are stationary. During the periods when the rolls 3 are rotated, a roving will be fed to the rolls 2, and will be drawn between the rolls 2 and 3 in accordance with the size of the coarse parts of the yarn, and this roving will be thus spun and twisted in with the yarn A′ to form the varying lengths of coarser yarn. In case the yarn is to be provided with bunches or noil at irregular intervals, this may be accomplished by feeding a noil roving to the rolls 2.

By providing additional rolls for feeding additional roving at intervals either in producing a spun or in producing a twisted yarn, yarn of more than two sizes embodying the invention may be produced.

Any suitable mechanism may be employed for driving the rolls 4 or the rolls 3 at irregular intervals and during irregularly varying periods. One form of such mechanism is shown and described in my application No. 480,153.

Having explained the nature and object of the invention, and specifically described forms of yarn in which the invention may be embodied, what I claim is:—

1. A yarn consisting of varying lengths of a predetermined size, alternating with varying lengths of larger size formed by spinning in additional material, substantially as described.

2. A yarn consisting of predetermined irregularly varying lengths of fine yarn, alternating with predetermined irregularly varying lengths of coarse yarn formed by spinning in additional material, substantially as described.

3. A yarn consisting of various lengths of predetermined size alternating with varying

lengths of larger size formed by spinning in additional material and bunches irregularly distributed along the yarn, substantially as described.

4. A one ply yarn consisting of varying lengths spun of a predetermined size alternating with varying lengths spun of larger size, substantially as described.

5. A one ply yarn consisting of varying lengths spun of a predetermined size alternating with varying lengths spun of larger size, and bunches irregularly distributed along the yarn, substantially as described.

6. A one ply yarn consisting of predetermined irregularly varying lengths spun of a predetermined size alternating with predetermined irregularly varying lengths spun of predetermined larger size, substantially as described.

7. A one ply yarn consisting of predetermined irregularly varying lengths spun of a predetermined size alternating with predetermined irregularly varying lengths spun of predetermined larger size, and bunches of indeterminate size occurring at indeterminate intervals along the yarn, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

WILLIAM P. WOOD.

Witnesses:
A. T. BURNS,
J. W. BAKER.