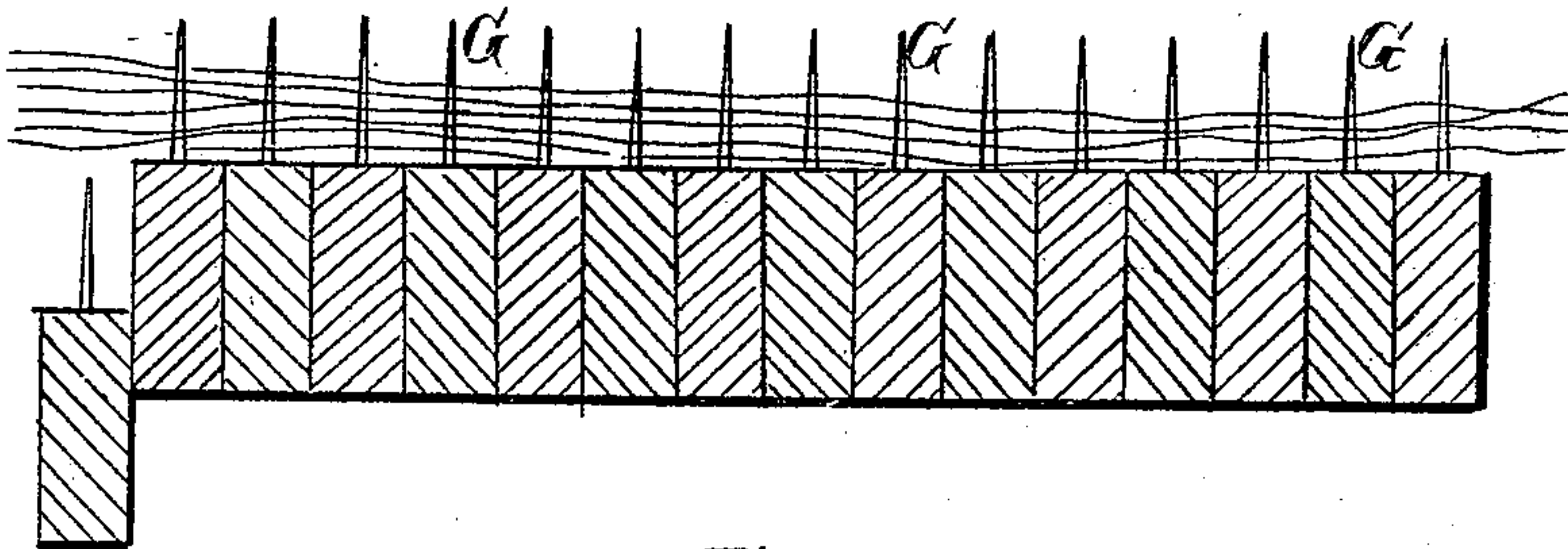


*A. Hayward,*  
*Hoop Skirt.*

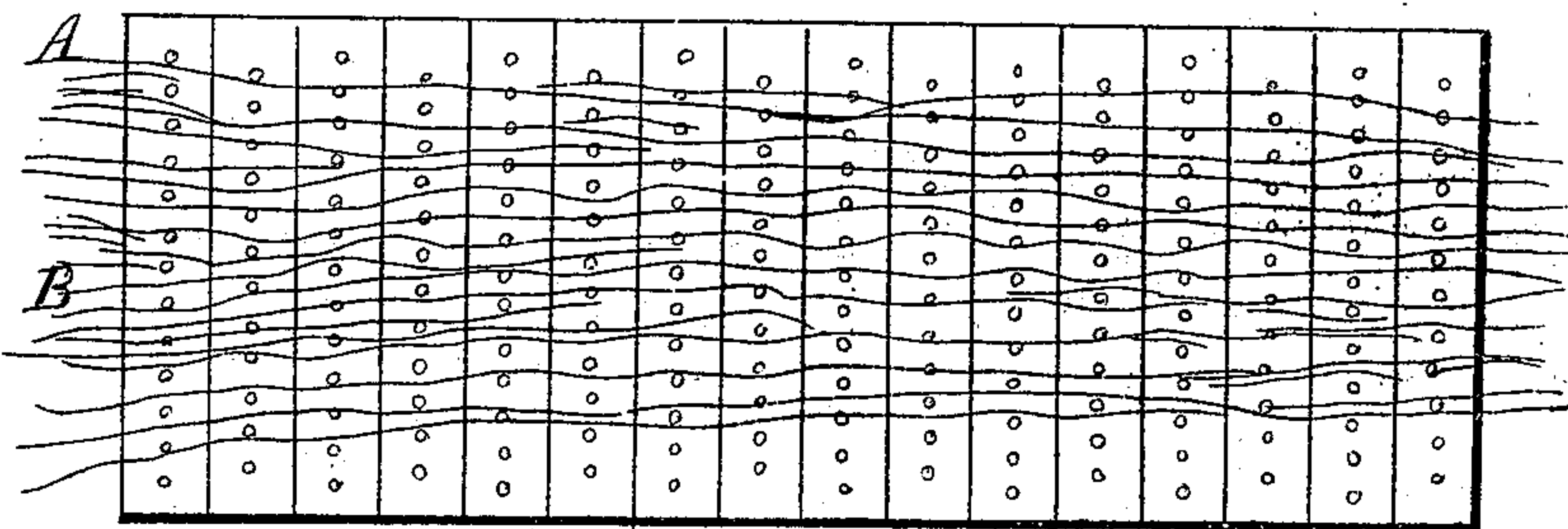
*No. 93,200.*

*Patented Aug. 3, 1869.*

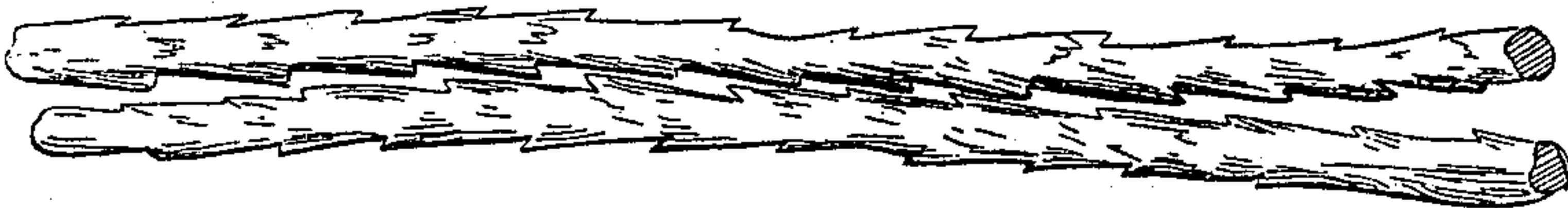
*Fig. 1*



*Fig. 2.*



*Fig. 3*



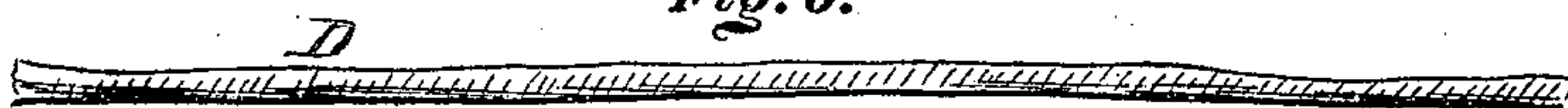
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



*Witnesses.*

*W. C. Dyer*  
*D. W. Peterson*

*Inventor.*

*A. Hayward*



# United States Patent Office.

HENRY HAYWARD, OF NEW YORK, N. Y.

Letters Patent No. 93,200, dated August 3, 1869.

## IMPROVEMENT IN STIFFENING-CORD FOR SKIRTS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HENRY HAYWARD, of the city and county of New York, in the State of New York, have invented certain new and useful Improvements in the Manufacture of Stiffening-Cord for Skirts and analogous articles of clothing; and I do hereby declare that the following is a full and exact description thereof.

I employ horse-hair as the material, and conduct the manufacture in a peculiar manner, which insures a reversing of a portion of the hairs; that is to say, the hairs are presented, some with their barbs toward one end of the cord, and the remainder with their barbs toward the other end of the cord, and the distribution is very equal and general.

The microscope, and various physical tests show that horse-hair is indented, scaled, or barbed over its surface, the points all being inclined from the roots and toward the outer ends of the hairs.

My invention locks the barbs together, so that the stiffening-cord, while possessing all the stiffness due to the peculiar material, also possesses a greater tensile strength than has ever before been attained with the use of such a material.

I avoid entirely the necessity for any other fibre being mixed with the horse-hair. A covering or wrapping may be employed or not, as preferred.

The accompanying drawings form a part of this specification.

Figure 1 is a section of the roving, or loose collection of hair, in the act of being drawn on the gills.

Figure 2 is a plan of the same.

Figure 3 is a view of two of the hairs magnified, showing their reverse arrangement relatively to each other.

Figure 4 shows the roving or sliver partially twisted.

Figure 5 shows the same completely twisted and half covered.

Figure 6 shows the yarn finished in the most approved manner.

Similar letters of reference indicate corresponding parts in all the figures.

A is a sliver, composed of horse-hairs loosely extended on gills G, which are operated, in connection with drawing rolls, in the manner ordinarily practised in the drawing and spinning of flax and analogous long fibres.

B is a sliver of similar material, fed upon the same

gills, so that its fibres run alongside of and mingle with the fibres in the sliver A. Both are drawn together and form a single sliver, D.

I draw and double my sliver as many times as may be desired. At each operation I reverse the position of one of the slivers, that is to say, I take away the sliver, whether in a can, or a ball, or cop, or other approved means, in such a manner as to allow the sliver to be drawn off, commencing at the end first put on. For example, supposing the sliver to be coiled in a can, like cotton roving, I provide cans capable of being opened at either end, and reverse the position of the can, so as to draw it from what was originally the foot or bottom of the can, when the sliver is to be redrawn. I thus associate together two slivers, one of which is reversed relatively to the other, that is, if from two cans, I draw one sliver, commencing at what was originally the bottom of the can, and the other sliver commencing at what was originally the top of the can; or, if taken from hollow balls, I commence with one ball, drawing from the exterior of the ball, and with the other ball drawing from the interior, or from the hole in the centre of the ball.

The horse-hair may be drawn and regulated as much as may be desired before the reversing has commenced. One reversing will pretty effectually distribute the hairs, but two or three redrawings, each time reversing the position of one of the slivers relatively to its mate, insure a still more perfect distribution. The final sliver, having the hairs thus distributed, is spun by ordinary spinning-mechanism, and may be wound on bobbins, or otherwise stored to be subsequently used.

I do not claim yarns composed of twisted horse-hair, except when the hairs are peculiarly arranged as above described.

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

The new manufacture of covered, or wrapped horse-hair yarns, herein described, having half the hairs reversed in position relatively to the others, substantially in the manner and for the purposes herein set forth.

In testimony whereof, I have hereunto set my name, in presence of two subscribing witnesses.

HY. HAYWARD.

Witnesses:

W. C. DEX,

D. W. STETSON.