(No Model.)

S. SPOONER.

WARP FABRIC.

No. 519,101. Patented May 1, 1894.

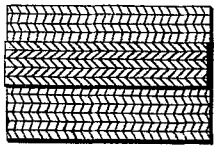
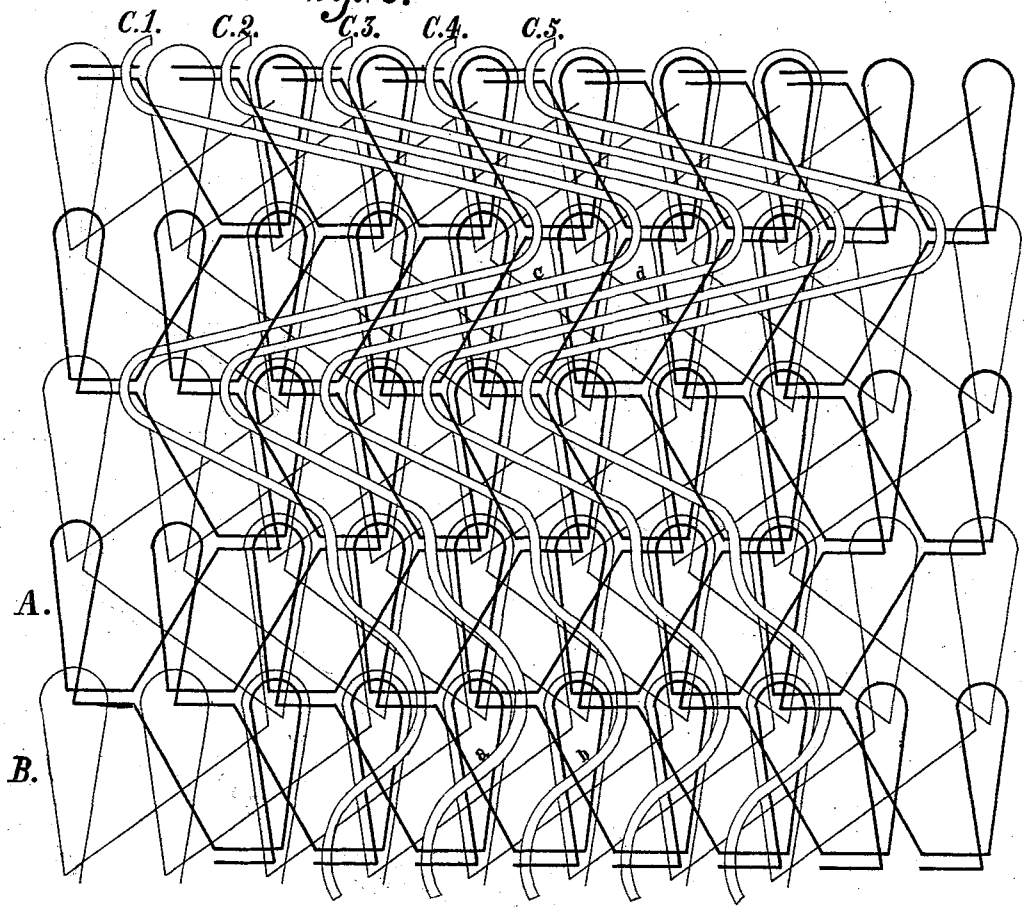
Fig. 1.  *E.*

Fig. 2.



WITNESSES:

Herbert O Sharpe

Alfred H. Slack.

INVENTOR,

Spencer Spooner.

BY R Burnham Moffat

ATTORNEY.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

SPENCER SPOONER, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE JENNINGS LACE WORKS, OF NEW YORK.

WARP FABRIC.

SPECIFICATION forming part of Letters Patent No. 519,101, dated May 1, 1894.

Application filed August 10, 1893. Serial No. 482,864. (No specimens.)

To all whom it may concern:

Be it known that I, SPENCER SPOONER, warp-textile designer, a citizen of the United States of America, residing in the city of Brooklyn, county of Kings, and State of New York, have invented a new and Improved Warp Fabric for the Finger-Tips and other Parts of Gloves, Parasols, and the Like; and I do hereby declare that there follows below a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved warp fabric of two or more thicknesses in the same piece, for use in gloves, parasols and like articles wherein it is essential or desirable that some portions of the article be of greater thickness than the portions adjacent thereto.

The leading characteristic of my invention is the production of such varying degrees of thickness by means of the introduction on the back surface only of the fabric, of one or more additional sets of threads, whether of the same or of different material from that of which the fabric itself is constructed, which threads so introduced are not a necessary part of the structure of such fabric.

In the drawings, Figure 1 represents a piece of my improved warp fabric made in accordance with my invention. Fig. 2 is a plan-view and shows the relations of the strands, the one to each other, and clearly illustrates my improved fabric.

My improved warp-fabric is made on an ordinary warp machine which is a machine used for making laces and jersey fabrics whose nature is to be more or less elastic. Such fabrics are produced upon such machines by linking or looping together upon the needles, the threads which are fed to the needles through guides arranged on guide-bars, which guide-bars traverse desired distances from right to left, the threads always following to a certain extent the direction of the selvages of the fabric.

In my improved fabric, two or more sets of body threads are employed in making the fabric, (two being shown in the drawings,) as A, B, Fig. 2. These are threaded through two or more sets of guides on as many separate guide-bars, which guide-bars move from right to left, in opposite directions, and lap or loop the threads on the needles in the usual way for making jersey fabrics on this character of machine. There is thus produced the ordinary jersey fabric as indicated in Fig. 2, without the several threads C′, C^2, C^3, C^4 and C^5 which appear therein. I now add one or more sets of threads (only one being shown in the drawings), as C′, C^2, C^3, C^4, and C^5 for the purpose of thickening and strengthening the fabric in desired portions. This additional set of threads is fed through guides arranged on a separate guide-bar, which additional guide-bar is placed in the machine between the guide-bars feeding the threads A and B. Such additional guide-bar never laps or loops the threads on the needles, (as the guide-bars used in constructing the fabric itself do,) but inlays such threads in the fabric by ascending so that its guides are between the needles and descending so as to bring them between the same needles, although it does not return until after the threads from the lower guide-bar have been lapped or looped over the needles. The threads from this middle or additional guide-bar are thus trapped or inlaid by the threads from the lower guide-bar and held by them on to the back surface of the fabric. When the middle or additional guide-bar has returned below the needles, it traverses one or more needles as may be desired to the right, and then after going up through the needles and repeating the process above described and returning again through the same needles, traverses back to its first position. In this way I add but little to the thickness, weight or strength of the fabric, and make to all appearances on the face or front side, the ordinary jersey fabric. The course of such additional threads, C′, C^2, C^3, C^4 and C^5 may be seen in the lower part of Fig. 2 of the drawings, and it will be noted that such threads lie entirely behind, or, as you look at the drawings, on top of the threads B, and always on top of the loop and under the traverse of the threads A, which latter threads are thus seen, as has been already stated, to hold such additional threads on to the back surface of the fabric. Now, at certain intervals or wherever it may be desired to strengthen or thicken the fabric, (as indi-

cated at E, Fig. 1,) the middle or additional guide-bar traverses one or more needles in excess of the number traversed in making the thinner portion of the fabric, and, when the end of such traverse is reached, goes up between the needles then adjacent to the guides and returns between the same needles without lapping or looping its threads over those needles, as the lower guide-bar in the meantime will have done with its threads.

It will of course be seen at once that the greater the number of needles the middle or additional guide-bar thus traverses, the greater will be the length of thread inlaid on the surface of the fabric, and the closer to each other such inlaid threads will lie. The body or weight of the completed fabric, therefore, will in such parts be in proportion to the number of needles traversed by this middle or additional guide-bar. Following now, on the drawings, (Fig. 2,) the course of this inserted thread, we see at the bottom that the five parallel threads C′, C², C³, C⁴ and C⁵, (all of which are carried on the middle or additional guide-bar, five being taken for illustration, merely,) traverse to the right one needle; then go up between the adjacent needles and come down between the same needles without lapping them, being, however trapped by the threads A, which, fed from the lower guide-bar of the machine, have looped those very needles while the middle or additional guide-bar was above them; then traverse to the left one needle, where the same process is repeated; then again to the right, and so on, until it is desired to make a thicker portion of the fabric. When such effect is desired, the middle or additional guide-bar is made to traverse to the left three needles in excess of the number traversed in making the thinner part of the fabric, although in the drawings it appears to have traversed but two needles to the left because, traveling in the same direction as the lower guide-bar which feeds the threads A, the threads C′, C², &c., will roll over and off the loop which is made by the threads A on the third needle of the traverse of the middle guide-bar, and so they appear from the drawings as well as from the completed fabric to have traversed but two needles to the left. Obviously a different number of needles in excess may be traversed by the middle or additional guide-bar for the purpose of thickening or strengthening the material, and in either direction; but three needles to the left are taken here for the purpose of illustration, merely. At the end of such traverse, the threads which are fed by such middle or additional guide-bar, are there again trapped by the threads A from the lower guide-bar of the machine, in the manner above described. The threads from the middle or additional guide-bar, then traverse six needles to the right, although for reasons above described it appears from the drawings and from the completed fabric to have traversed but four needles in such direction, and although here, too, any number of needles might be so traversed,—six being taken for illustration, merely, where they are again in like manner trapped by the threads A from the lower guide-bar, and so on, through the thickened portion of the fabric.

A comparison of the lengths of the strands of the inserted thread, between the successive trappings by the threads A during the construction of the thinner part of the fabric, (as indicated by *a* and *b* in Fig. 2,) with the lengths of the same strands between the corresponding trappings during the construction of the thicker portion of the fabric, (as indicated by *c* and *d*,) shows that such threads in the thicker portion are of much greater length than the length of the same threads in the thinner knitted portion, while they are laid less than half as far apart.

It will be observed that the inserted thread never loops a needle, either in the thick or in the thin portion of the fabric, and it therefore appears on but one side or surface of the completed fabric.

By my invention I am enabled to make a large variety of thicknesses in the same piece of material, by the insertion on the back surface only of the fabric, of one or more threads of the same or of different material from that of which the fabric itself is constructed.

Having described my invention, I claim—

The herein described warp-fabric of varied thicknesses in the same piece, consisting of a body-fabric formed from a number of threads carried over one another and looped together, and a number of additional threads inserted at the back of said body-fabric and inlaid or trapped under some of the body-threads, said additional threads being laid alternately right and left over one or more loops of the body-fabric where the fabric is comparatively thin, and where the fabric is thick said additional threads being laid alternately right and left over one or more loops of the body-fabric in excess of the loops first traversed, substantially as set forth.

SPENCER SPOONER.

Witnesses:
H. O. SHARPE,
ALF. H. SLACK.