G. F. HUTCHINS AND G. CROSSLAND.

DOUBLE PILE FABRIC AND METHOD OF MAKING THE SAME.

APPLICATION FILED MAR. 20, 1917.

1,307,008.

Patented June 17, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

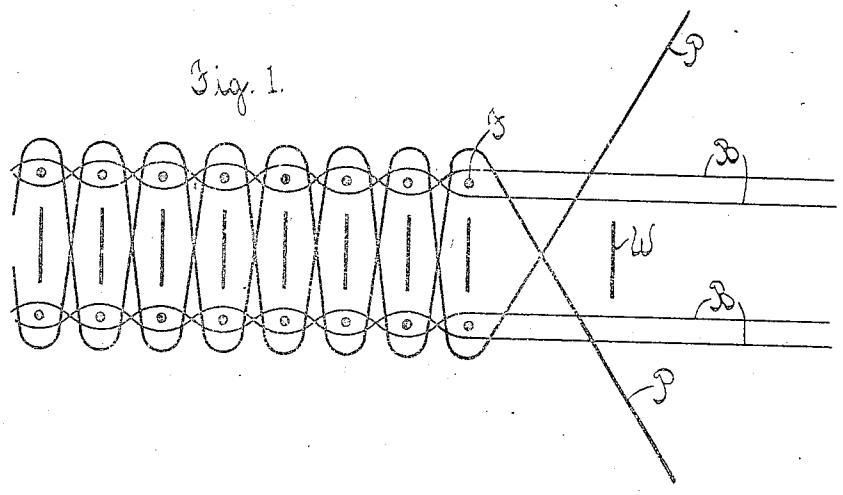
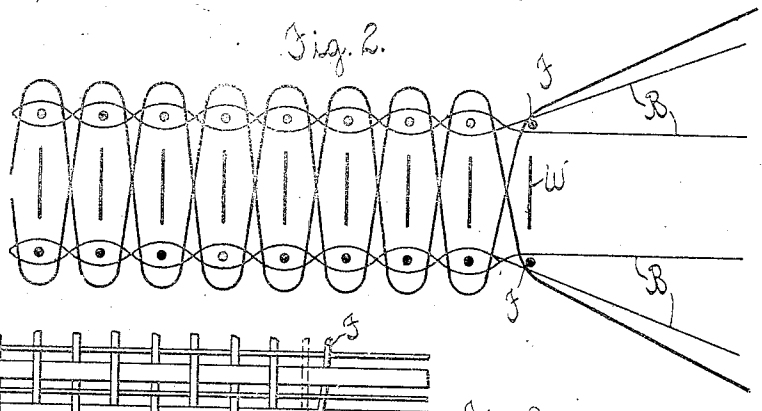


Fig. 2.



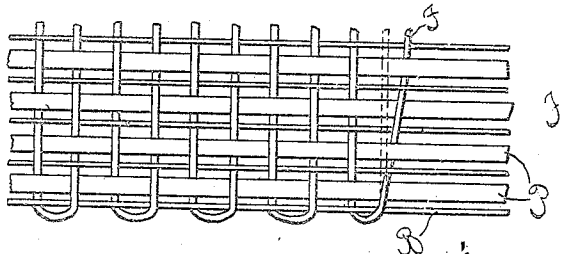


Fig. 3.

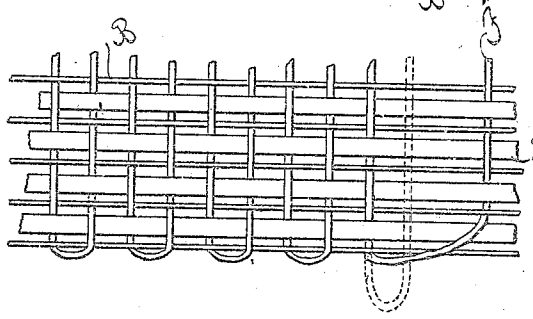


Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 5.

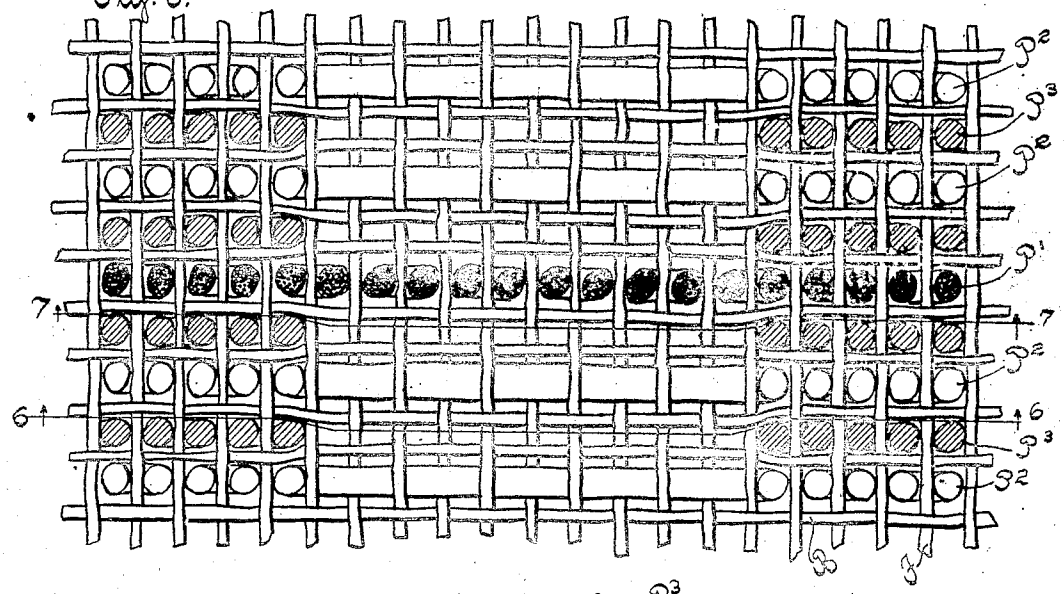


Fig. 6.

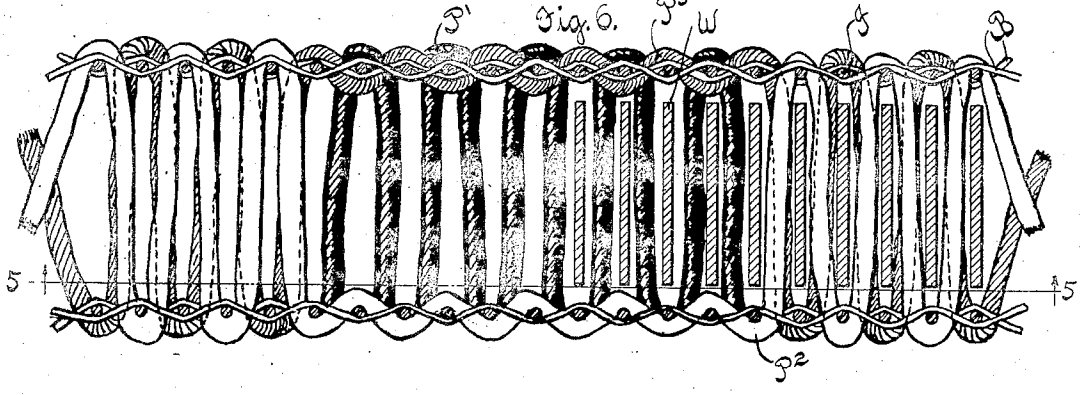
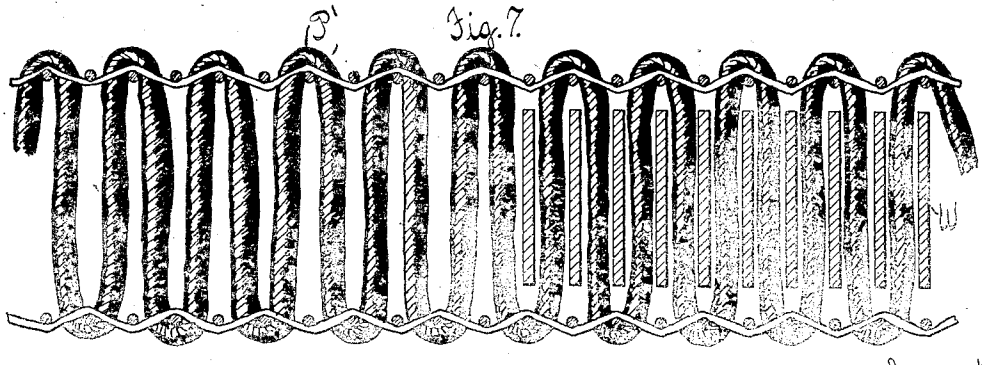


Fig. 7.



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GEORGE F. HUTCHINS AND GEORGE CROSSLAND, OF WORCESTER, MASSACHUSETTS, ASSIGNORS TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

DOUBLE-PILE FABRIC AND METHOD OF MAKING THE SAME.

1,307,008. Specification of Letters Patent. Patented June 17, 1919.

Application filed March 20, 1917. Serial No. 156,172.

To all whom it may concern:

Be it known that we, GEORGE F. HUTCHINS and GEORGE CROSSLAND, citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Double-Pile Fabric and Method of Making the Same, of which the following is a specification.

This invention relates to a double pile fabric and to a method for forming said fabric, and has particular reference to very heavy fabrics such as cocoa-mats and similar articles.

The material used in the manufacture of such fabrics is exceedingly stiff and unwieldy, and great difficulty is experienced in forming a satisfactory selvage when these fabrics are woven in power looms.

It is a principal object of our invention to provide an improved method of weaving such fabrics by the use of which a close and firm selvage may be secured.

To this end our improved method consists in part in inserting the pile wires after the crossing of the pile warps, but outside of said crossing, and in then beating up said wires and warps before inserting the filling. In the preferred form of our invention, the wires are securely retained in advanced position after being beaten up and the filling is then driven up on a separate beat of the lay before another pile wire is inserted.

It is customary to weave rugs and similar articles in series with interposed headings, and it is a further object of our invention to provide an improved double heading for thick heavy double fabrics, as well as an improved method for the manufacture thereof.

The double fabrics to which our improvements are particularly applicable are of very substantial thickness, and in order to maintain the successive portions of the fabric in proper alinement it is essential that the two surfaces or layers of the double heading should be similarly separated.

A feature of our invention of great importance relates to the correct spacing of these surfaces or layers by pile wires inserted between them, and particularly to the means and method of holding the pile wires in position. This we accomplish by crossing a sufficient number only of separated pile warps in the heading to retain the pile wires in upright position while the greater portion of the pile warps are woven directly into the separate flat layers of the heading.

Further features of our invention relate to arrangements of parts and details of construction and manipulation which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of our invention is shown in the drawings, in which—

Figure 1 is a diagrammatic sectional view of a portion of double pile fabric showing the pile warps crossed and the pile wire inserted outside of said crossing;

Fig. 2 is a diagrammatic view similar to Fig. 1, showing the pile wire beaten up, the binder warps separated to form a shed, and the filling inserted therein;

Fig. 3 is a partial plan view of the fabric shown in Fig. 2;

Fig. 4 shows the same fabric as it would appear if the filling were inserted immediately after the crossing of the pile warps and before the pile wire had been beaten up;

Fig. 5 is a sectional plan view of a portion of double pile fabric taken along the line 5—5 in Fig. 6, and showing the method of forming the heading, and

Figs. 6 and 7 are sectional elevations taken along the lines 6—6 and 7—7 in Fig. 5 respectively.

Referring to Figs. 1 to 4, we will first describe our improved method of weaving heavy fabrics, by which a firm selvage is secured. In Fig. 1 we have shown a double pile fabric having binder warps B, pile warps P, and filling F. Reference to the drawing will show that the fabric is of substantial thickness, being separated by pile wires W which are often from one to two inches in width.

In accordance with our improved method of weaving, we first cross the pile warps P, as shown in Fig. 1, and then insert a pile wire W outside of the crossing. The lay is then advanced to force the wire W to the position shown in Fig. 2, and devices are provided for preventing backward movement of the wire from this position,

As the wire is moved up the binder warps B are separated to form a shed, and the filling F is then inserted between the binder warps. Two shuttles are commonly used and the filling is simultaneously inserted in the two sheds. The lay then moves forward a second time to beat up the filling F, and during this beat of the lay the pile warps are again crossed, preliminary to the insertion of the succeeding pile wire.

The advantages attained by this improved method are clearly shown in Figs. 3 and 4. Fig. 3 shows the position occupied by the freshly inserted filling F when the pile wire is inserted and beaten up as above described. It will be seen that the filling is approximately in its final position at the selvage before it is beaten up, and that no looseness of the selvage is occasioned by the beating up of the filling thread. If the pile wire is not moved up and clamped against the pile warps before the filling is inserted, the filling will assume the position shown in full lines in Fig. 4, and when beaten up will occupy the position shown in dotted lines therein, leaving a very loose and unsatisfactory selvage.

So far as we are advised, this method of weaving double pile fabric is the only satisfactory method yet discovered by which heavy cocoa-mats and similar articles can be woven with a satisfactory selvage in power looms.

Referring to Figs. 5, 6 and 7, we have shown therein our improved heading and have indicated the method by which this heading is formed. As above indicated, the fabrics to which our invention is particularly applicable are of very considerable thickness, and it is essential that this thickness be maintained during the formation of the short heading which is interposed between the portions of the fabric which eventually form the separate articles of manufacture.

It is accordingly necessary that pile wires should be inserted in the heading in the same way that they are inserted in the body of the fabric, and when thus inserted it is essential that they should be maintained in upright position. In order to accomplish this result, we select certain pile warps spaced apart throughout the width of the fabric and we cross these warps in the heading as in the body of the fabric. The number of these warps is made as small as possible, and they are only sufficient in number to hold the pile wires in position. The remaining warp threads are woven directly into the separate portions of the double heading without crossing from one side of the fabric to the other.

This method of forming a heading is clearly shown in the drawings in which the dark colored pile warp P′ is crossed throughout the heading to retain the pile wires W in position, while the lighter colored pile warps P^2 and P^3 are crossed in a similar manner in the body of the fabric, but are confined to a single surface or layer of the fabric during the formation of the heading.

We thus maintain the thickness of the fabric and at the same time materially decrease the amount of pile warp material required, as the warps P^2 and P^3 do not cross from side to side of the fabric, and a large amount of material is thus saved.

It is found that a very small number of warps P′ are sufficient to retain the wires W in position, not over four warps being required in a door mat or rug of ordinary width. The few tufts produced in the heading in cutting the rugs apart can be readily removed after the pile is cut, and will not materially disfigure the finished articles.

Having thus described our invention it will be evident that changes and modifications can be made in our improved methods and the products thereof without departing from the spirit and scope of our invention as set forth in the claims, and we do not wish to be otherwise limited to the details herein disclosed, but what we claim is—

1. The method of weaving double pile fabrics having spaced parallel woven layers which consists in crossing the pile warps between said layers, inserting a pile wire outside of the crossing, beating up said pile wire, inserting a filling shot in each woven layer before again crossing the pile warps, and thereafter beating up the filling shots and pile wire and crossing the pile warps rearward of said wire.

2. The method of weaving double pile fabrics having spaced parallel woven layers which consists in crossing the pile warps between said layers, inserting a pile wire outside of the crossing, moving forward said pile wire and retaining it in advanced position, inserting the filling in each woven layer, without crossing the pile warps, and thereafter beating up the filling and again crossing the pile warps.

3. The method of weaving double pile fabrics having spaced parallel woven layers which consists in crossing the pile warps between said layers, inserting a pile wire outside of the crossing, forcing forward said pile wire, separating the binder warps in each layer of the fabric to form sheds for the passing of the shuttles, retaining the pile wires in advanced position, inserting the filling in said sheds without crossing the pile warps, and thereafter beating up said filling and again crossing the pile warps rearward of said pile wire.

4. The method of weaving double pile fabrics with interposed headings which consists in weaving the entire fabric with the layers

separated by pile wires, crossing certain selected pile warps only to hold the pile wires in place in the heading, and weaving the remaining pile warps directly into the separated flat surfaces of the heading.

5. The method of weaving double pile fabrics with interposed headings which consists in weaving the fabric with a plurality of pile warps and interposed pile wires, and weaving the heading also with interposed pile wires but with a reduced number of pile warps crossing between the fabrics while at the same time the remaining pile warps are woven into the separated heading layers without crossing from side to side of the fabric.

6. A heading for double pile fabrics comprising spaced layers of fabric containing the binder warps and the greater portion of the pile warps of the pile fabric and joined together by a few selected pile warps effective merely to prevent displacement of the pile wires during the weaving of the heading.

7. A double pile fabric comprising body portions and interposed headings, the latter being formed of two separate flat fabric portions joined only by single pile threads spaced apart and effective to retain the pile wires in upright position between said flat portions of the headings.

8. A double pile fabric comprising body portions having closely adjacent pile warps crossing from one layer of the fabric to the other, and having interposed headings in which separated pile warps only cross from one layer of the heading to the other, the intervening pile warps being woven directly into the two layers of the heading.

In testimony whereof we have hereunto affixed our signatures.

GEORGE F. HUTCHINS.
GEORGE CROSSLAND.