

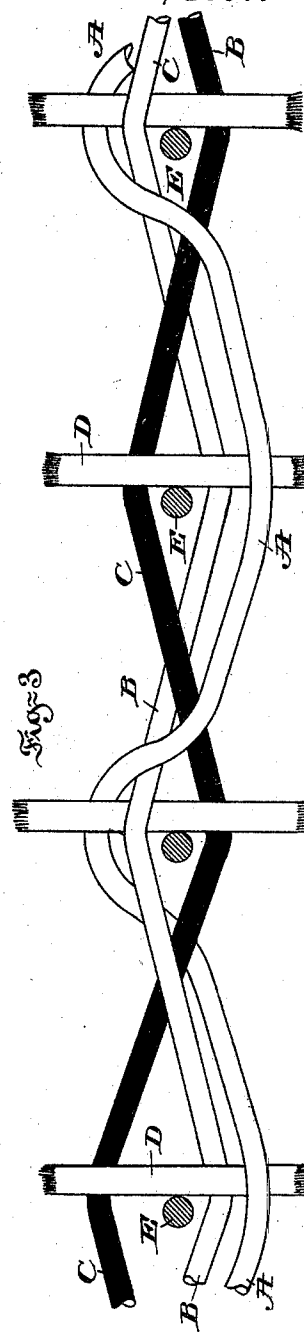
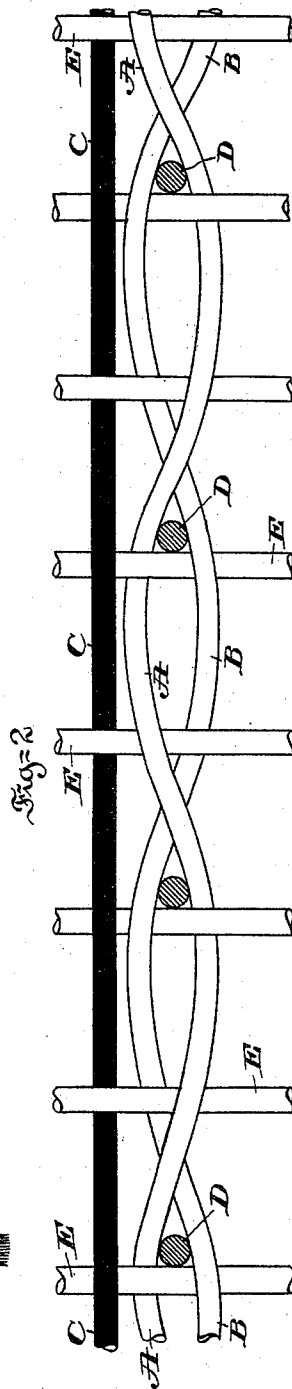
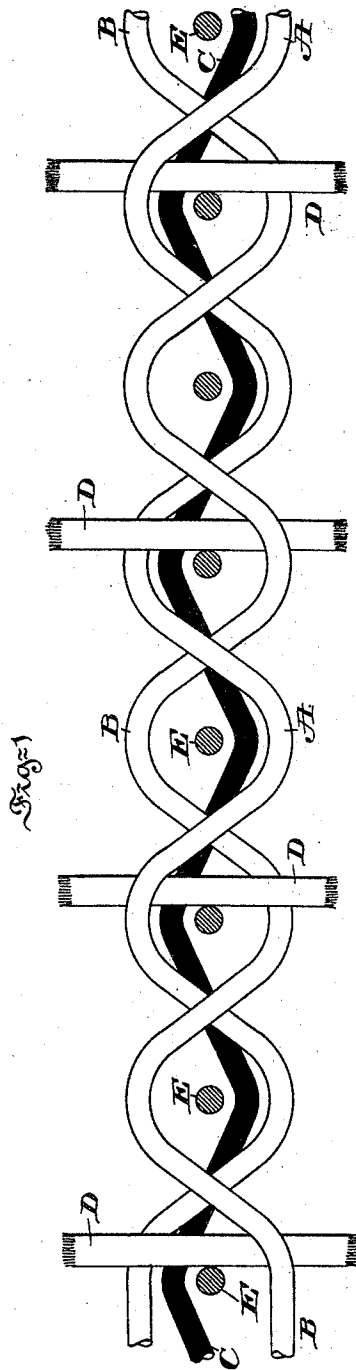
(No Model.)

6 Sheets—Sheet 1.

W. BRIMFIELD.
WOVEN PILE FABRIC.

No. 577,836.

Patented Mar. 2, 1897.



Witnesses:
W. A. Schaffer.
Harry Shreds

Inventor.
William Brimfield
by his attorney
Chas A. Rutter.

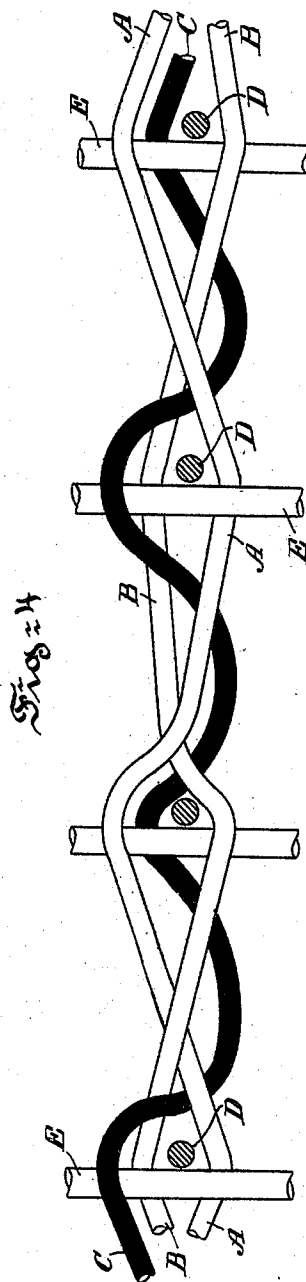
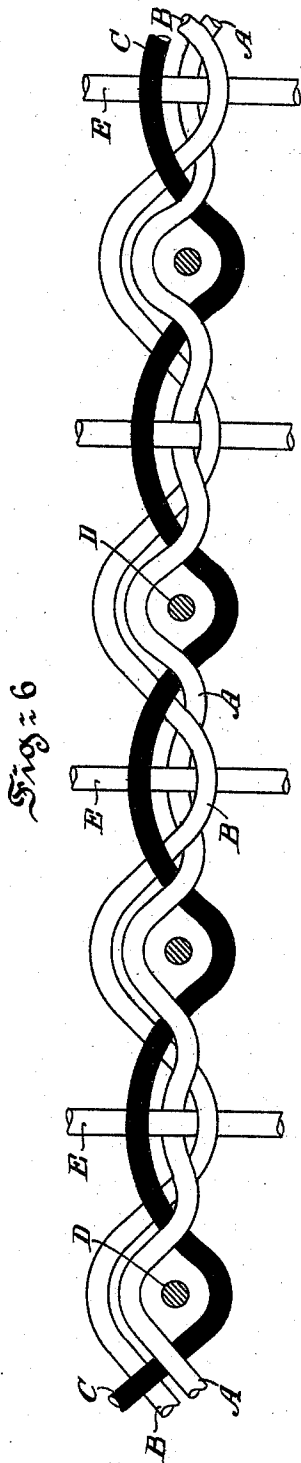
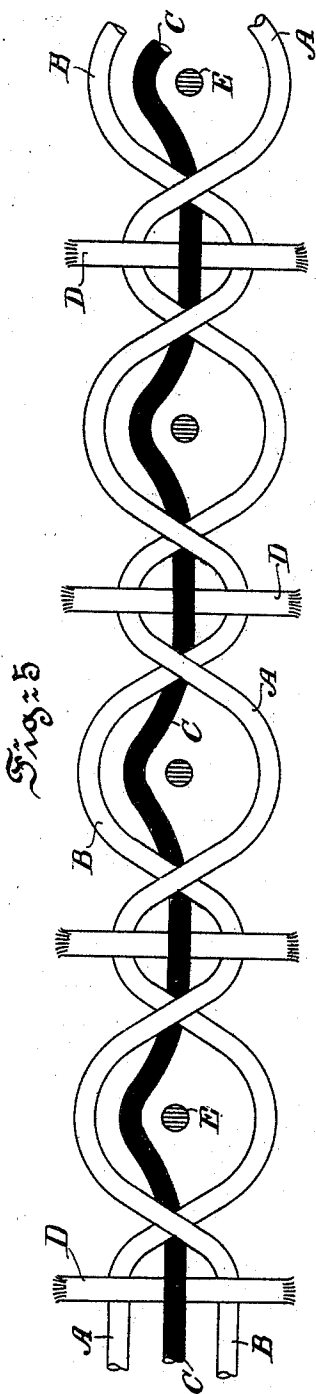
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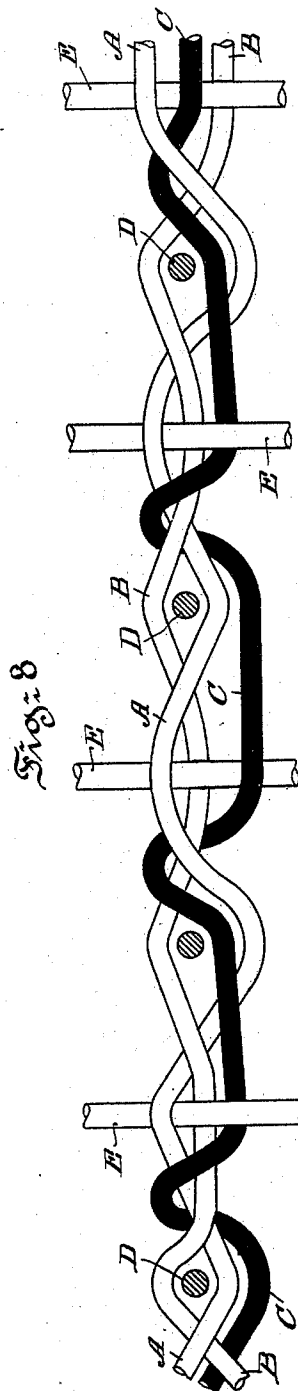
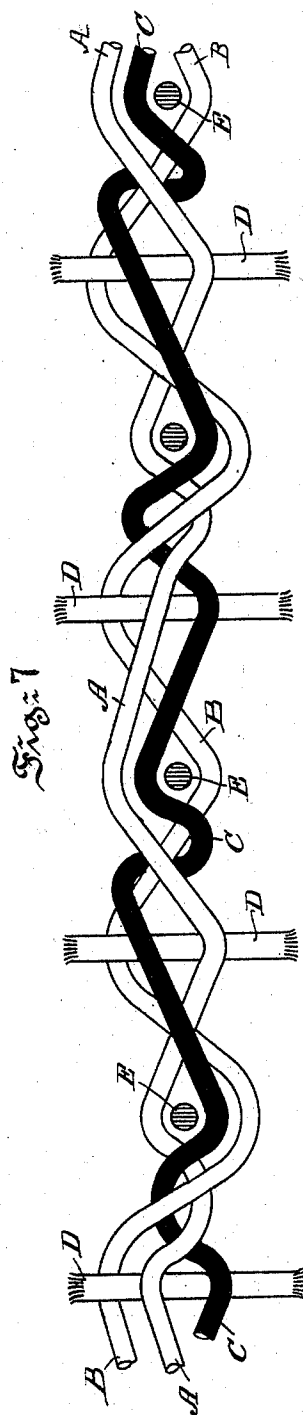
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6 Sheets—Sheet 4.

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Fig. 9

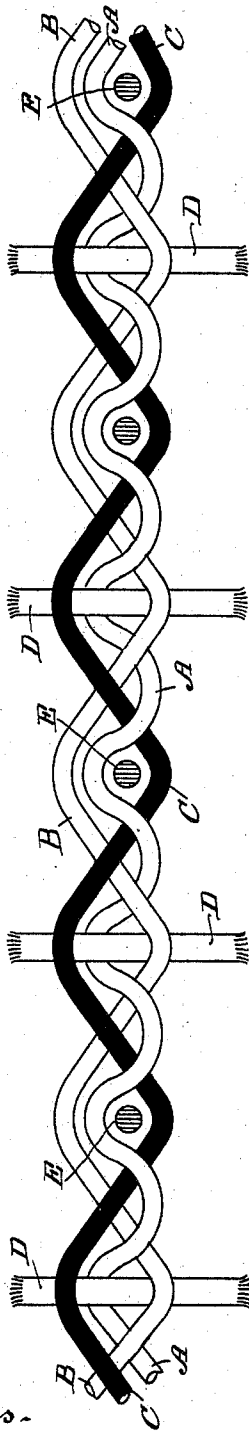
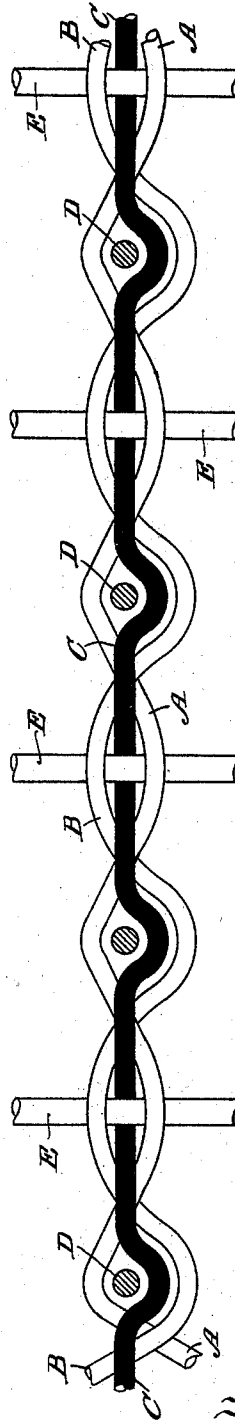


Fig. 10



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Fig. 11

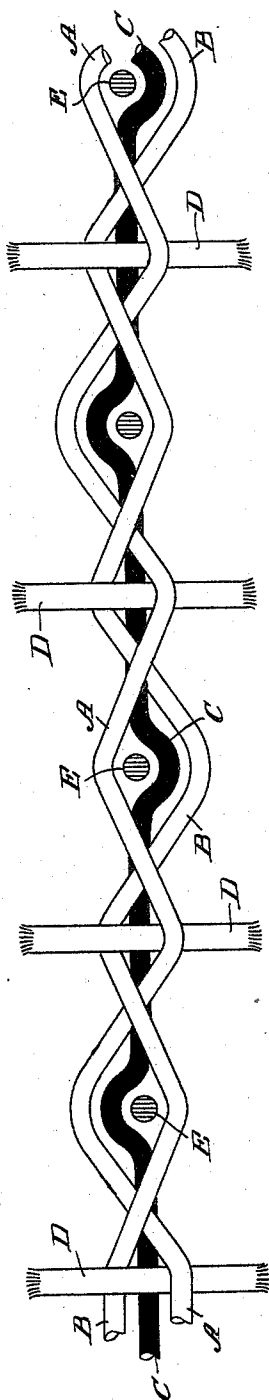
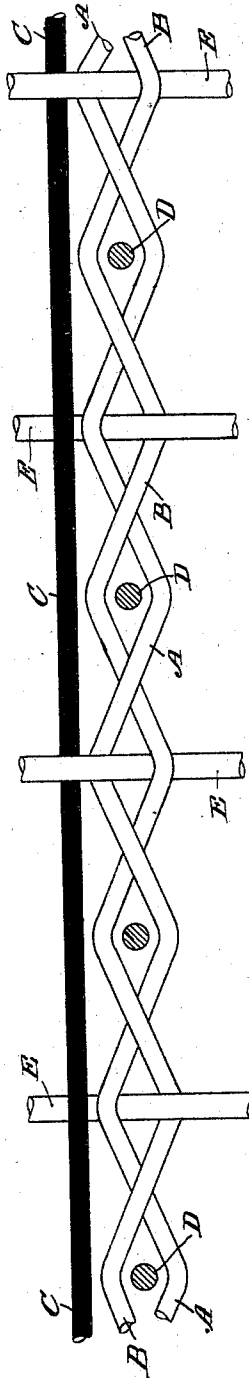


Fig. 12



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Fig. 15

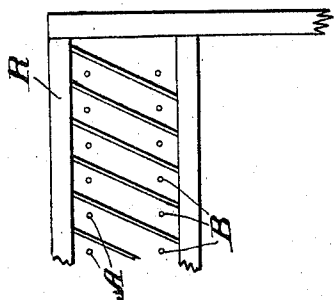
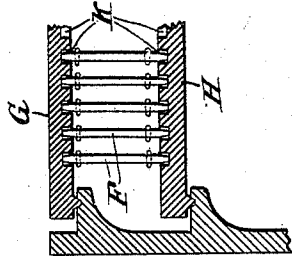


Fig. 16

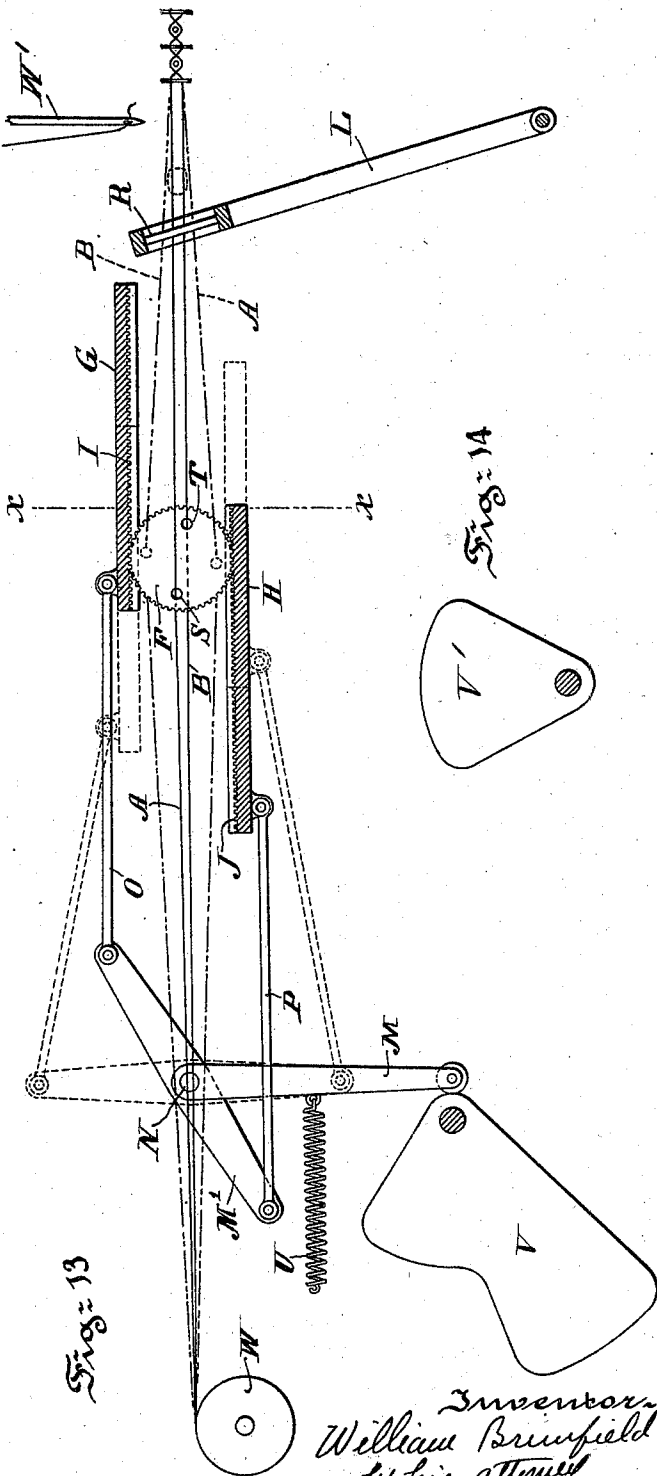
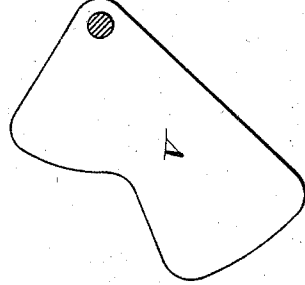
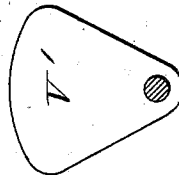


Fig. 13

Fig. 14



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UNITED STATES PATENT OFFICE.

WILLIAM BRIMFIELD, OF BLUE ANCHOR, NEW JERSEY.

WOVEN PILE FABRIC.

SPECIFICATION forming part of Letters Patent No. 577,836, dated March 2, 1897.

Application filed January 3, 1896. Serial No. 574,225. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BRIMFIELD, a citizen of the United States, and a resident of Blue Anchor, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Woven Pile Fabrics, of which the following is a specification.

My invention relates to improvements in woven pile fabrics; and the object of my invention is to furnish an improved arrangement of threads for holding the pile-yarn in the fabric.

In my improved pile fabric two or more of the warp-threads are so disposed as to grasp and firmly hold the pile-yarn in place, the warp-threads being wound or twisted around the pile-yarn, not the pile-yarn around the warp-threads or weft-filling, as has heretofore been done.

In the accompanying drawings, forming part of this specification and in which similar letters of reference indicate similar parts throughout the several views, Figure 1 is a diagrammatic side elevation of one form of my improved pile fabric; Fig. 2, a plan of Fig. 1. Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 are diagrammatic side elevations and plans of other forms of my improved pile fabric; Fig. 13, a diagrammatic side elevation of a machine for producing my fabric; Fig. 14, a side elevation of a cam; Fig. 15, a section of Fig. 13 on line *x x*; and Fig. 16 a front elevation of part of reed, Fig. 13.

A, B, and C are the warp-threads. The threads A B may be called the "locking" warp-threads, and C the "stuffing" warp-thread, the purpose of which is to give body to the fabric.

D is the pile-yarn, and E the weft-filling.

My improved lock for the pile-yarn may be formed in two ways: first, by rotating the warp-threads which form the lock, the one about the other a half-turn or one hundred and eighty degrees, inserting the pile-yarn, and then rotating the threads back again, (this form of lock is shown in Figs. 1 and 2,) second, by causing the warp-threads which form the lock to rotate one about the other a full turn or three hundred and sixty degrees, then causing them to rotate back again and inserting the pile-yarn at suitable intervals.

This second form of lock is shown in Figs. 3 to 12.

In Figs. 1 and 2 the warp-threads A B pass first one over and the other under a weft filling-thread E, then the first thread under and the second over the next weft filling-thread, and so on, as is usual; but between each shot of weft-filling E the warp-threads A B are together revolved one-half a turn or one hundred and eighty degrees, as best shown in Fig. 2, and then back again, which causes a double crossing of the warp-threads, forming a mesh which lies horizontally, as shown in Fig. 2. The pile-yarn is inserted vertically at suitable intervals in the meshes formed between the warp-threads A B, one side of the pile-yarn being, when the fabric is tightened, driven up against the weft E by the closing of the warp-threads A B, which, owing to their crossing, as described, hug it closely and effectually prevent it being drawn from its place in the completed fabric. The warp C is in this case used merely as a stuffer for giving body to the fabric. It is placed between two sets of the warps A B and passes alternately over and under the weft-threads E, as shown.

In Figs. 3 and 4 the warp-threads A B are arranged so as to pass both over one weft-thread, then both below the next weft-thread, and so on. These threads are together twisted in one direction three hundred and sixty degrees between alternate shots of weft-filling E and then back three hundred and sixty degrees in the same manner as shown. The stuffing warp-thread C passes over the weft-threads that the other warp-threads pass under, and under the weft-threads that the other warp-threads pass over, and in passing up and down it passes through the loops formed by the crossing of these other warp-threads. The pile-yarn D is placed through the loops formed by the crossing of the warp-threads and rests against one side of the weft-threads, as shown in Figs. 1 and 2, being held in the triangular inclosures between the weft-threads and the warp-threads.

In Figs. 5 and 6 the warp-threads A B pass one above and the other under each weft-thread, the thread A passing under each weft-thread, and the thread B over each weft-thread. These threads are between each

weft-thread looped or crossed, as shown best in Fig. 5, the thread A first passing under thread B and then over this thread. This crossing is made by revolving the threads together first three hundred and sixty degrees in one direction and then back again. Between each revolution in one direction the weft-filling E is shot, and between each revolution in the other direction the pile-yarn is placed. The stuffing warp-thread C passes over all the weft-threads, as shown, and is drawn in between the loops which are formed by the other warp-threads between the weft-threads, when these warp-threads are given a complete turn, in a loop form. The pile-yarn D is passed down between the warp-threads A B and the warp-thread C, the two former being upon one side of the pile-yarn, the latter upon the other side. When the fabric is beaten up, these warp-threads are drawn against the pile-yarn, holding it securely in place.

In Figs. 7 and 8 the warp-threads A B are again between each weft-thread twisted three hundred and sixty degrees to form the lock for the pile-yarn which is inserted in the lock, as shown. The stuffing warp-thread C in this case passes under one weft-thread, then up to one side of the threads A B and the pile yarn D, then over the threads A B down upon the other side of these threads, over again to the first side, then over the next weft-thread, then again as before under and over the warps A B, again under the next weft-thread, and so on.

In Figs. 9 and 10 the threads A B make a complete twist of three hundred and sixty degrees between each weft-thread to form the locks for the pile-yarn which is passed between the two loops formed by these warps, as shown. The warp-threads A B are arranged so as to be always on one side of all the weft-threads, and the warp stuffing-thread C passes always to the same side of the pile yarn threads, then down between threads A B under the weft-threads E, up between threads A B, and so on.

In Figs. 11 and 12 the lock for the pile-yarn is formed as before, that is, by twisting the warp-threads completely around or three hundred and sixty degrees at and between each weft filling-thread, the two loops formed by the warp-threads between each weft-thread forming a mesh through which the pile-yarn is passed and between which it is held when the fabric is beaten up. The stuffer C, as was the case with the stuffer described in connection with Figs. 1 and 2, is merely used to give body to the fabric.

In all the figures shown it will be observed that the pile-yarn is held in place by the warp-threads, which are so disposed that they are wound around the pile, not the pile around the warps.

The advantages that I claim for my invention are, first, a perfectly tight lock for the pile-yarn; second, cheapness of construction

combined with excellence of finish. In a pile fabric the pile is the only part of the fabric that is seen. The warp and weft threads, serving merely as a binder to hold the pile-yarn in place, may be of some cheap material—jute, cotton, or linen. The pile-yarn is the expensive material, and all of this material which is held by the body of the fabric is lost. In my fabric the expensive pile-yarn, usually wool, is used in the most economical manner. It practically passes straight through the fabric in a direction normal or perpendicular to it, and is not bent or wound around the warp or weft threads, and owing to this saving of material I am able to produce a fabric with considerably less pile-yarn than has heretofore been possible.

I do not desire to confine myself to any particular mechanism for forming my fabric, as it may be made by several machines. I show, however, in Fig. 13 a skeleton side elevation of a device by means of which the fabric may be produced. In this figure W is the warp-beam; L, the lay; R, the reed; A B, warp-threads; F, disks, the peripheries of which are furnished with teeth, as shown. G H are bars one above the other below the disks F, which are furnished with grooves K, in which are placed racks I J, which are adapted to engage with the teeth on the disks F. The disks F are held horizontally by the grooves K in the bars G H. M is a lever fast to a shaft N; M', a lever. O P are connecting-rods, the outer ends of which are pivoted to lever M' at equal distances from the shaft N, as shown, and the other ends of which are pivoted to the bars G H. V is a cam adapted to engage and rock lever M, shaft N, and lever M'. S T are perforations diametrically opposite one another in disks F, through which the warp-threads A B pass, the former through the perforation S, the latter through the perforation T.

The disks F take the place of the ordinary heddles for opening and closing the shed, and they at the same time cause the half or full turn to be given to the warps.

The movement of the cam V, which may be driven in any suitable manner, causes the lower end of the lever M to be moved outward and its upper end to be moved inward, and the connecting-rods then pull the bars G H, the latter out and the former in, moving the racks I J in opposite directions at the same speed, and the disks F are turned about their axes, but with the exception of this turning they do not change their relative positions. When the racks are all the way out or all the way in, the holes or perforations S T stand vertically one above the other, and the shed is open for the passage of the shuttle. If the racks are operated so as to cause the disks to turn one hundred and eighty degrees, the shed is gradually closed, the warps A B are caused to twist one about the other one-half turn, as shown in Figs. 1, 2, 3, and 4, and the shed is then again gradually opened.

On the return movement of the disk the operation is reversed.

If the racks are operated so as to cause a complete revolution of the disks, the warps will be rotated a full turn, as shown in Figs. 5 to 12.

In Fig. 13 the cam V is adapted for moving the lever M so as to cause a full revolution of the disks F. In Fig. 14 a cam V' is shown, which is adapted to cause the disks to make one-half a revolution. The cams shown are adapted to cause a movement of the lever M in only one direction, a spring U being used to return this lever and its connected parts to their first position.

Fig. 15 is a section of Fig. 13 on line *xx* and shows the arrangement of the bars G H, the disks F, and the frame for carrying the bars.

Fig. 16 is an end elevation of part of the reed R, which shows a diagonal arrangement of the dents, which arrangement causes the horizontal opening of the warp-threads A B in order to allow the easy passage of the needle W', which places the pile-yarn in the fabric.

The needle W' is operated by the Jacquard or other mechanical arrangement, which is

well known to all weavers and which need not be described in detail here.

The warp stuffing-thread may be caused to take the several positions shown in the drawings by heddles in the usual manner.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The double-faced pile fabric herein described, consisting of weft-threads, warp-threads twisted back and forth, and substantially straight tuft-pieces passing from face to face of the fabric at right angles thereto, said tuft-pieces being gripped and held by the twisted warp-threads.

2. The double-faced pile fabric herein described, consisting of weft-threads, warp-threads which are twisted together between the weft-threads, and substantially straight tuft-pieces which are gripped and held in the triangular inclosures formed by the weft-threads and the twisted warp-threads.

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Witnesses:

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