

No. 696,015.

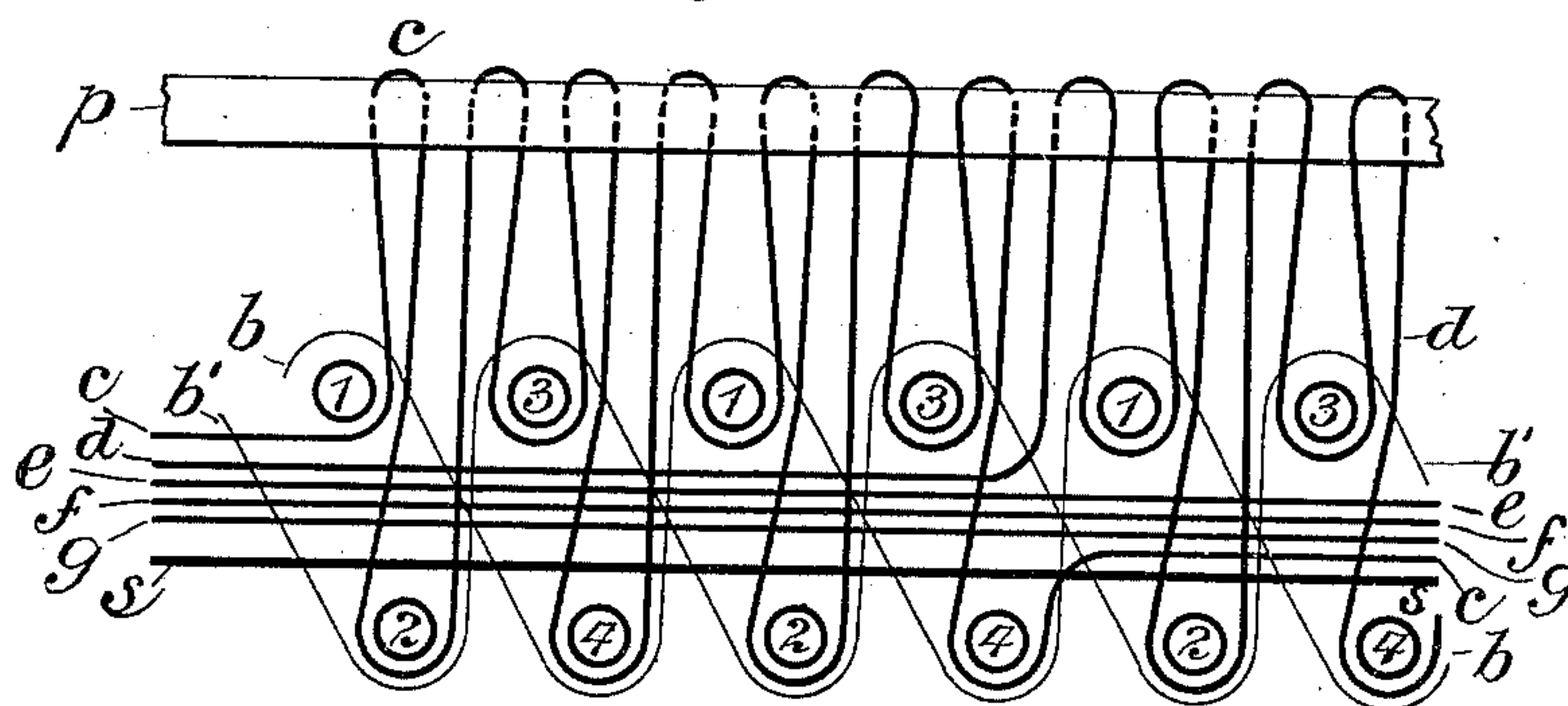
Patented Mar. 25, 1902.

T. B. DORNAN.  
WOVEN PILE FABRIC.

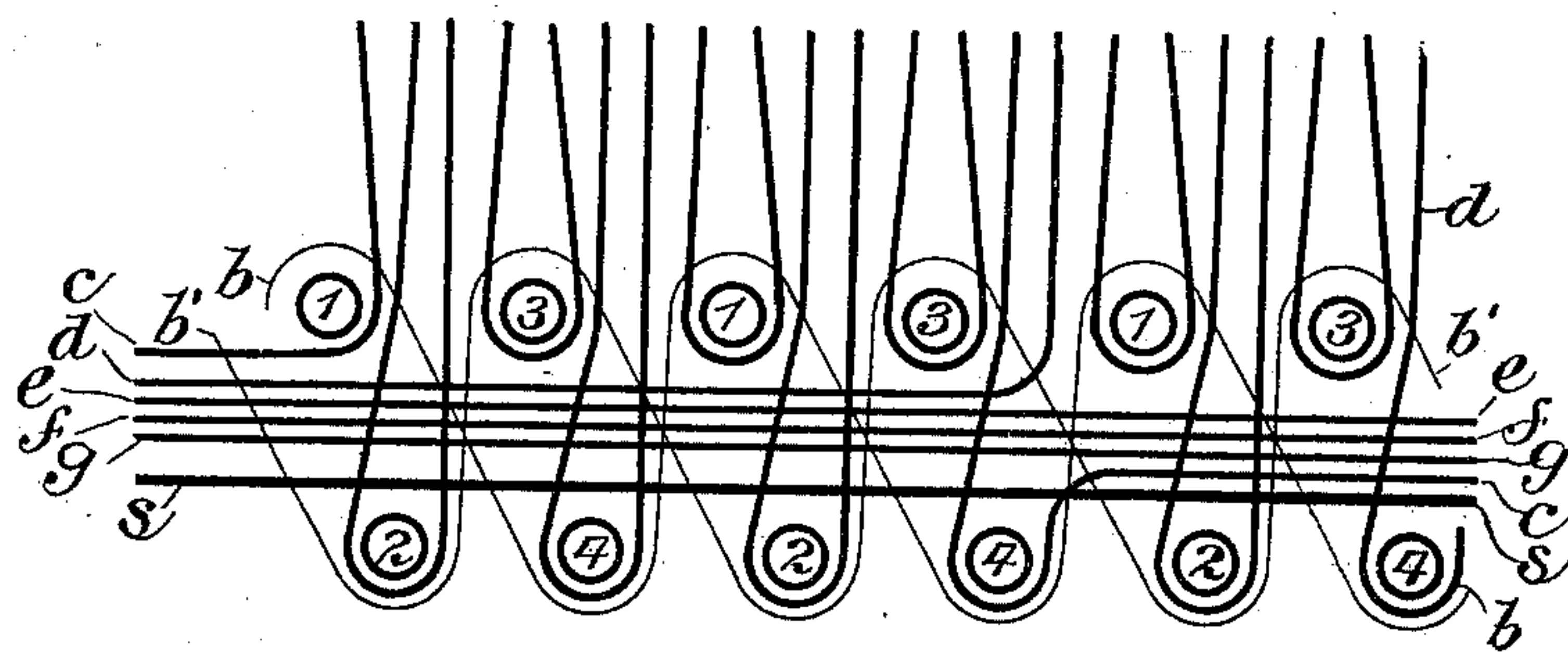
(Application filed July 17, 1901.)

(No Model.)

*Fig. 1.*



*Fig. 2.*



Witnesses  
Edward C. Rowland  
John H. Barnes

Inventor  
Thomas Benton Dornan  
By his Attorney  
Henry D. Williams

# UNITED STATES PATENT OFFICE.

THOMAS BENTON DORNAN, OF PHILADELPHIA, PENNSYLVANIA.

## WOVEN PILE FABRIC.

SPECIFICATION forming part of Letters Patent No. 696,015, dated March 25, 1902.

Application filed July 17, 1901. Serial No. 68,564. (No specimens.)

*To all whom it may concern:*

Be it known that I, THOMAS BENTON DORNAN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Woven Pile Fabrics, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to woven pile fabrics; and it consists of an improved fabric having binder weft-threads and binder warp-threads and pile-forming figuring warp-threads, the fabric having a plurality of plies and the pile-forming figuring warp-threads forming a pile projecting at one face only of the fabric and bound at both the upper and the lower ply of the fabric, and thus in part extending entirely through the fabric, whereby a very tight and effective tying of the figuring warp-threads is attained and being bound by each weft-thread in the upper and lower ply of the fabric, whereby a great amount of surface or pile yarn is had in proportion to the amount of fabric woven.

My invention further consists in various improvements in the construction of the fabric, whereby the advantages above referred to are attained and whereby a fabric is produced of superior pattern exhibiting capacity and in which the proportion of expensive yarns lying unused within the fabric is greatly diminished and by which the cost of production of the fabric is diminished and the appearance of the fabric improved and the durability of the fabric increased.

I will now describe the construction of pile fabric embodying my invention, illustrated in the accompanying drawings, forming part hereof, and will thereafter point out my invention in claims.

Figure 1 is a diagrammatic view illustrating a vertical longitudinal section of a portion of a pile fabric embodying my invention in the process of weaving the fabric. Fig. 2 is a similar view illustrating the same portion of the fabric after the pile has been cut and sheared.

The binder weft-threads are arranged in sets of four weft-threads each, the several weft-threads in each set being designated by the numerals 1, 2, 3, and 4, respectively, and

are arranged alternately at the upper and lower faces of the fabric, the binder weft-thread 1 being at the upper face, the binder weft-thread 2 at the lower face, the binder weft-thread 3 at the upper face, and the binder weft-thread 4 at the lower face.

The binder warp-threads are arranged in two sets, interwoven with the weft-threads to form two plies, the binder warp-threads passing from ply to ply and binding alternate binder weft-threads. The binder warp-threads are designated *b* and *b'*, respectively, and the drawings show one binder warp-thread of each set.

The figuring warp-threads are shown as arranged in five sets, each of which may be of a different color and are designated *c*, *d*, *e*, *f*, and *g*, respectively, and the drawings show one figuring warp-thread of each set. These figuring warp-threads are separately brought to the upper surface to form the pile. The stuffer warp-threads, of which one set is provided in the fabric shown, and therefore one thread *s* appears, remain at all times in the body of the fabric.

The drawings illustrate several successive sets of weft-threads and one of each of the binder warp-threads, figuring warp-threads, and stuffer warp-threads in the several sets thereof employed in the fabric illustrated. A part of one of the pile-forming wires or bars *p* is shown in the position which it would occupy in the loom during the process of weaving the fabric and, as will be seen, the figuring warp-threads are carried laterally over this longitudinal pile-wire in the formation of each pile-loop, the thread of the loop passing upward at one side of the longitudinal pile-wire and downward at the other side thereof and then upward on the same side as that on which it passed down and then downward on the side at which it originally passed up, so that each alternate loop of pile warp-thread passes over the pile-wire in the same direction. The pile-loop tied by the first weft-thread or first upper-ply weft-thread 1 in a set of weft-threads passes under that weft-thread and up over the pile-wire and then down through the fabric and to the lower face thereof and around the second weft-thread or first lower-ply weft-thread 2 of the set, and then upward through the fabric



and over the pile-forming wire, and then downward and under the third weft-thread or second upper-ply weft-thread 3 of the set, and then upward and over the pile-wire and then downward through the fabric and around the fourth weft-thread or second lower-ply weft-thread 4 of the set, and then upward and over the pile-wire and downward to pass under and be tied by the first weft-thread or first upper-ply weft-thread of the succeeding set of weft-threads. Each alternate pile-loop is therefore tied by a weft-thread in the same face of the fabric, and each pile-loop is tied at one end by a weft-thread at the upper face of the fabric and at the other end by a weft-thread at the lower face of the fabric, and the end that is tied at the lower face of the fabric passes entirely through the fabric and is subjected to the binding and gripping action resulting from the pressures of the other threads of the fabric, and in consequence of this construction a very firm tying or binding of the pile-loops is attained. In a construction where the pile-loops are cut, as illustrated in Fig. 2, so as to produce a Wilton fabric, the various tufts of fabric will be firmly tied, for, although one tuft will be tied in the upper ply and the next tuft in the lower ply, the tuft tied in the upper ply will be subjected to the friction resulting from passing between the same upper-ply weft-threads as the tuft extending upward through the fabric from the lower ply.

In the part of the fabric shown the figuring warp-thread *c* is brought to the surface to form the pile-loops through a portion of the fabric, and this figuring warp-thread *c* is then buried in the fabric and the figuring warp-thread *d* brought to the surface to form the pile in the succeeding portion of the fabric. It is of course evident that any one of the figuring warp-threads may be brought to the surface as desired for the production of various patterns and color effects.

By reason of the great number of pile loops or tufts in proportion to the weft-threads the body of the fabric may be coarsely woven, thereby effecting a saving both in the time required for weaving the fabric and in the quantity of material employed in making the fabric, or the figuring warp-threads may contain less yarn—as, for example, twofold worsted may be employed instead of the threefold worsted now usually employed, or economies may be effected in both particulars. The proportion of drag warp-threads to pile is very much less in my improved fabric than in the ordinary Brussels or Wilton fabrics. My improved fabric also has an ornamented back, as the tying of the pile-forming figuring warp-threads around each weft-thread of the lower ply produces at the back of the fabric a pattern and coloring corresponding with that on the face of the fabric.

In the weaving of the fabric a loom having longitudinal pile wires or bars will be employed, and the looping of the pile-forming

figuring warp-threads over the longitudinal pile-forming wires or bars may be accomplished in any well-known manner. The figuring warp-threads would be controlled by a jacquard mechanism and the stuffer warp-threads could be controlled by the jacquard or by heddles or journals, and the binder warp-threads would preferably be controlled by heddles or journals.

It is evident that in the various applications of my invention many modifications will be made in the colorings and details of construction.

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

1. A pile fabric comprising binder weft-threads and binder warp-threads and pile-forming figuring warp-threads, the binder weft-threads and binder warp-threads being interwoven to form a plurality of plies and the pile-forming figuring warp-threads forming a pile projecting at one face only of the fabric and the pile being composed of threads bound by each weft-thread in the different plies of the fabric and extending outwardly to form the pile on each side of each weft-thread on the pile-face only of the fabric.

2. A pile fabric comprising binder weft-threads and binder warp-threads and pile-forming figuring warp-threads, the binder weft-threads and binder warp-threads being interwoven to form an upper and a lower ply and the pile-forming figuring warp-threads forming a pile projecting at one face of the fabric and the pile being composed of threads bound by each of the weft-threads in the upper and lower plies and extending outwardly to form the pile on each side of each weft-thread on the pile-face only of the fabric.

3. A pile fabric having an upper and a lower ply and comprising binder weft-threads and binder warp-threads and pile-forming figuring warp-threads, the pile-forming figuring warp-threads forming a pile projecting at one face only of the fabric and the pile being composed of threads alternately bound in the upper and lower plies of the fabric, and looped around and extending outwardly to form the pile on each side of each weft-thread on the pile-face only of the fabric.

4. A pile fabric having an upper and a lower ply and comprising binder weft-threads and binder warp-threads and pile-forming figuring warp-threads, the binder weft-threads being arranged alternately in the upper and lower plies of the fabric and the pile-forming figuring warp-threads forming a pile projecting at one face only of the fabric and the pile being composed of threads bound by each binder weft-thread, and extending outwardly to form the pile on each side of each weft-thread on the pile-face only of the fabric, substantially as set forth.

5. A two-ply pile fabric comprising binder weft-threads and binder warp-threads and pile-forming figuring warp-threads, the binder weft-threads being arranged alternately in



the upper and lower plies of the fabric and the pile-forming figuring warp-threads forming a pile projecting at one face only of the fabric and the pile being composed of threads  
 5 bound by each binder weft-thread, and extending outwardly to form the pile on each side of each weft-thread on the pile-face only of the fabric, substantially as set forth.

6. A cut-pile fabric comprising binder weft-  
 10 threads and binder warp-threads and pile-forming figuring warp-threads, the binder warp-threads and binder weft-threads being interwoven to form a plurality of plies and the pile-forming figuring warp-threads form-  
 15 ing a pile consisting of tufts projecting at one face only of the fabric and the pile being composed of threads bound by each weft-thread of the different plies of the fabric and extending outwardly to form the pile on each side of  
 20 each weft-thread on the pile-face only of the fabric, substantially as set forth.

7. A pile fabric having an upper and a lower ply and composed of binder weft-threads arranged in sets of four weft-threads  
 25 each, such weft-threads being disposed alternately in the upper and lower plies of the fabric, and of binder warp-threads arranged in two sets and passing alternately from ply to ply and binding the weft-threads, and of  
 30 a plurality of pile-forming figuring warp-threads bound in the pile-forming portions thereof alternately at the upper and lower plies of the fabric by each binder weft-thread thereof, substantially as set forth.

35 8. A cut-pile fabric having an upper and a lower ply and composed of binder weft-threads arranged in sets of four weft-threads each, such weft-threads being disposed alternately in the upper and lower plies of the  
 40 fabric, and of binder warp-threads arranged in two sets and passing alternately from ply to ply and binding the weft-threads, and of a plurality of pile-forming figuring warp-

threads successively bound by each of the weft-threads at the upper and lower plies of 45 the fabric, substantially as set forth.

9. A pile fabric having an upper and a lower ply and composed of binder weft-threads arranged in sets of four weft-threads  
 50 each, such weft-threads being disposed alternately in the upper and lower plies of the fabric, and of binder warp-threads arranged in two sets and passing alternately from ply to ply and binding the weft-threads, and of  
 55 a plurality of pile-forming figuring warp-threads forming a pile projecting from one face only of the fabric and the pile-threads being bound alternately at the upper and lower plies of the fabric by each binder weft-thread thereof, and extending outwardly to  
 60 form the pile on each side of each weft-thread on the pile-face only of the fabric, substantially as set forth.

10. A cut-pile fabric having an upper and a lower ply and composed of binder weft- 65 threads arranged in sets of four weft-threads each, such weft-threads being disposed alternately in the upper and lower plies of the fabric, and of binder warp-threads arranged in two sets and passing alternately from ply 70 to ply and binding the weft-threads, and of a plurality of pile-forming figuring warp-threads forming a pile consisting of threads projecting from one face only of the fabric and the pile-threads being successively 75 bound by each of the weft-threads at the upper and lower plies of the fabric and extending outwardly to form the pile on each side of each weft-thread on the pile-face only of the fabric, substantially as set forth. 80

In testimony whereof I have affixed my signature in presence of two witnesses.

THOMAS BENTON DORNAN.

Witnesses:

HENRY D. WILLIAMS,  
 JOHN H. BARNES.