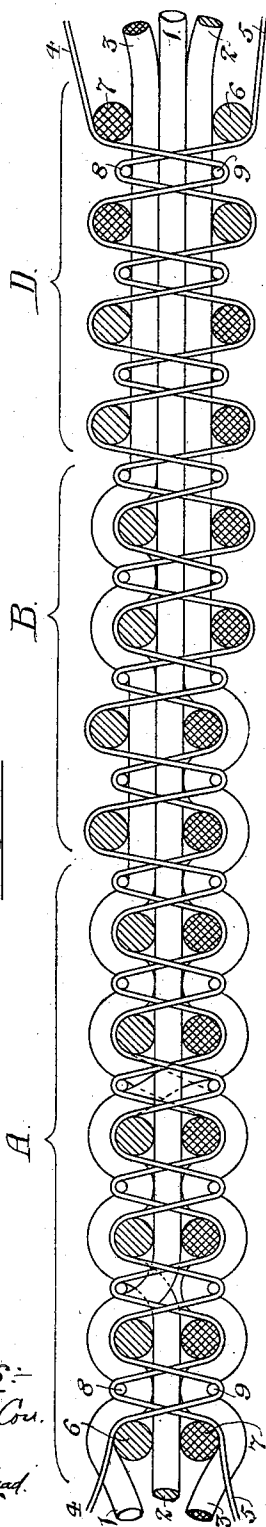


A. HEALD.
WOVEN FABRIC.

(Application filed Feb. 19, 1900.)

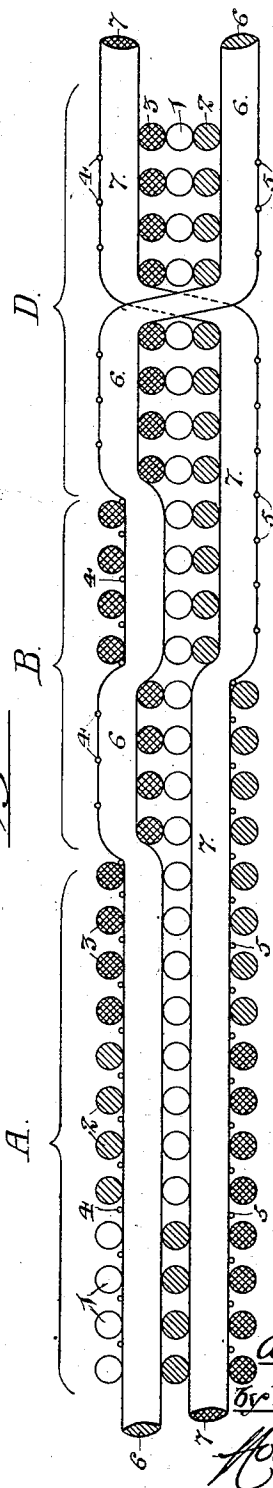
(Specimens.)

Fig. 1.



Witnesses:
Charles H. Coe.
Louis M. Whithead.

Fig. 2.



Inventor:
Alfred Heald.
By His Attorneys:
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UNITED STATES PATENT OFFICE.

ALFRED HEALD, OF PHILADELPHIA, PENNSYLVANIA.

WOVEN FABRIC.

SPECIFICATION forming part of Letters Patent No. 661,640, dated November 13, 1900.

Application filed February 19, 1900. Serial No. 5,754. (Specimens.)

To all whom it may concern:

Be it known that I, ALFRED HEALD, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Woven Fabrics, of which the following is a specification.

My invention consists of a woven fabric intended especially for carpets, rugs, and the like and of such character that while it can
10 be readily produced upon a loom such as is ordinarily employed for weaving ingrain carpet it will form an acceptable substitute for an ordinary Brussels carpet, as it bears a close resemblance to the latter in appearance
15 and diversity of coloring, while it has the additional advantage of being, like an ingrain carpet, double-faced and reversible, the fabric being, moreover, of close texture and having its faces or plies well tied together, so as
20 to be free from the objectionable pockets of an ingrain-carpet fabric. The fabric is also considerably cheaper than a Brussels-carpet fabric of corresponding quality.

In the accompanying drawings, Figure 1 is
25 an exaggerated section of my improved fabric, taken in the direction of the warp; and Fig. 2 is an exaggerated section of the fabric, taken in the direction of the weft.

The drawings, besides being exaggerated as
30 to the size of the threads, show the fabric as of open texture in order that the course of the separate threads can be readily followed. The actual fabric, while structurally similar to that shown, will have the threads more
35 closely bunched or beaten up.

My improved fabric in its preferred form consists of sets of patterning warp-threads alternating with pairs of fine binding warp-threads and pairs of heavy weft-threads alternating with pairs of fine weft-threads.
40 Each set of patterning warp-threads may comprise two, three, or more, and these threads may constitute either in whole or in part the surface-threads of the fabric where-
45 by the pattern is produced. Each set of these warp-threads forms on each face of the fabric successive loops very similar to the looped pile-threads of an ordinary Brussels carpet, the difference being that instead of
50 being tied into a backing fabric and otherwise unsupported these loops are filled and supported by the heavy weft-threads of the

fabric. The heavy weft-threads may serve simply as pile-loop filling or supporting threads or may in addition to performing this
55 duty in certain parts of the fabric appear upon either or both of the faces of the fabric in other parts, so as to diversify the coloring of the pattern. The fine weft-threads bind down and indent the pile-forming warp-
60 threads between the successive pairs of heavy weft-threads, so as to form the desired pile-loop effect, and the fine warp-threads bind together the fine weft-threads of each pair and
65 also the heavy weft-threads of each pair, so as to give the fabric the desired firm texture.

In the fabric shown in the drawings each set of pile-forming warp-threads comprises three threads 1, 2, and 3, these sets of pile-forming warp-threads being alternated with
70 the fine binding warp-threads 4 and 5, and the pairs of heavy weft-threads 6 and 7 alternate with the pairs of fine weft-threads 8 and 9. Where the pile-forming warp-threads constitute both faces of the fabric, one of said
75 warp-threads of each set appears upon one face and one upon the other face, the third thread being in the center of the fabric and one heavy weft-thread being inserted between said intermediate warp-thread and the warp-
80 thread of the upper face, while the other heavy weft-thread is inserted between said intermediate warp-thread and the warp-thread of the lower face, each face warp-thread being thus projected so that when it
85 is bound down tightly by the fine weft-threads between the successive pairs of heavy weft-threads it will form successive loops, and thus impart to each face of the fabric the looped pile appearance presented by a Brussels carpet. The structure thus described is that
90 shown in the portion of the fabric marked A in the drawings.

Where one of the heavy weft-threads appears upon one face of the fabric to aid in
95 the formation of the pattern, while the other face of the fabric is formed by one of the pile-forming warp-threads, the remaining warp-threads of the set pass between the surface weft-thread and the pile-filling weft-thread,
100 as shown in that portion of the fabric marked B in the drawings, and where the heavy weft-threads appear upon both faces of the fabric to form the pattern all of the pile-form-

ing warp-threads pass between said weft-threads, as shown in those portions of the fabric marked D.

I am aware that it has been proposed to
 5 make double-faced fabric having a Brussels effect on each face by the use of successive pairs of pile-forming warp-threads alternat-
 10 ing with a single binding warp-thread, these warp-threads being interwoven with heavy weft-threads, the insertion of each of which was followed by the insertion of a fine bind-
 15 ing weft-thread, each binding warp-thread passing over a heavy weft-thread, then over a binding weft-thread of one face, then under a heavy weft-thread and under a binding weft-thread of the other face, then over a heavy weft-thread and over a binding weft-thread of the first face, then under a heavy weft-thread and a binding weft-thread of the
 20 other face, and so on indefinitely, the effect being that the fine warp-threads separated and pulled apart in the direction of the length of the fabric the heavy weft-threads, so as to cause a diagonal disposition of the succes-
 25 sively-inserted heavy weft-threads, which caused the production of a flat loop of pile-warp, the fact that each binding warp-thread passed successively over a thick weft-thread and over a fine weft-thread also preventing
 30 that drawing down of the fine weft-threads which is necessary in order to form a high and well-defined loop of pile-warp. In the fabric alluded to, moreover, the surfaces of the fabric were formed wholly by the warp-
 35 threads. Hence it will be noted that my invention is distinguished from that referred to in several respects—namely, in having successive pairs of binding warp-threads, each of which after passing over one heavy weft-
 40 thread passes under a fine weft-thread, or vice versa, so that the heavy weft-threads are drawn into position one above the other and the fine weft-threads are drawn down deeply between them. Furthermore, in my
 45 improved fabric provision is made for the use of the heavy weft-threads not only as pile-supporting threads, but also as surface or pattern-forming threads, and while my invention in its broader embodiment contem-
 50 plates a fabric having but two pile-forming warp-threads in each set three or more of such threads in each set are by preference employed, not only for the additional coloring effect, but for the purpose of separating
 55 the successively-inserted heavy weft-threads, and thus enabling each of them to best perform its duty of filling the pile-loop in those portions of the fabric in which the surface is composed of such pile-loops.

60 Where but two pile-forming warp-threads are used in each set, a single heavy weft-thread may be used instead of a pair of such weft-threads, and this weft-thread may or may not appear upon the surface of the fabric, as desired; but where there are three or
 65 more pile-forming warp-threads in each set at least two successively-inserted heavy weft-

threads will be employed, so that one may lie between a pile-forming warp-thread of each face of the fabric and the intermediate or
 70 embedded pile thread or threads of the set.

The fabric which I have described can be easily woven upon a loom such as is now employed for the weaving of ordinary two-ply
 75 ingrain carpet, since the insertion of the weft-threads in the improved fabric involves simply a repetition of a certain order of picking four shuttles, as in the ordinary ingrain-loom. The jacquard mechanism, however, if employing the usual notched ground and
 80 figure lift-boards should be modified so as to have the notches of both boards facing in the same direction instead of oppositely and should also provide for the lifting of both
 85 boards simultaneously instead of alternately, as usual, whereby any desired one of the harness-tails may be lifted on each pick of the loom. Such changes, however, are of a simple character and can be readily effected at
 90 small expense.

Although I have described my invention as a carpet or rug fabric and although it has been devised especially for the production of
 95 such fabrics, it will be evident that the invention can be embodied in fabrics of a finer character, such as those intended for curtains, upholstery, or the like.

I do not herein claim specifically that form of my improved fabric represented at B and D, as this embodiment of my invention forms
 100 the subject of a separate application filed by me on the 24th day of October, 1900, Serial No. 34,149.

Having thus described my invention, I claim and desire to secure by Letters Pat-
 105 ent—

1. A woven fabric in which sets of pile-forming warp-threads alternating with binding warp-threads are interwoven with heavy weft-threads alternating with binding weft-
 110 threads, said pile-forming warp-threads producing pile-loops on both faces of the fabric, the heavy weft-threads distending said pile-loops, the binding weft-threads tying and indenting the pile-forming warp-threads between the heavy weft-threads, and each binding warp-thread passing around a heavy weft-thread, thence to and around a binding weft-thread and thence back and around a heavy weft-thread, substantially as specified.
 120

2. A woven fabric in which sets of pile-forming warp-threads alternating with binding warp-threads are interwoven with heavy weft-threads alternating with binding weft-
 125 threads, said pile-forming warp-threads producing pile-loops on both faces of the fabric in some portions of the same and being distended by the heavy weft-threads at such places, the heavy weft-threads covering the pile-forming warp-threads on one or both
 130 faces of the fabric in other portions of the same, the binding weft-threads tying and indenting the surface warp-threads between the heavy weft-threads, and each binding warp-

thread passing around a heavy weft-thread, thence to and around a binding weft-thread and thence back to and around a heavy weft-thread, substantially as specified.

5 3. A woven fabric in which sets of pile-forming warp-threads, each comprising three or more threads, alternating with binding warp-threads, are interwoven with heavy weft-threads in sets or pairs alternating with
10 binding weft-threads, two of the pile-forming warp-threads of each set forming loops on the opposite faces of the fabric, and the remaining thread or threads of the set occupying an intermediate position, a heavy weft-thread of
15 each set or pair occupying a position between such intermediate warp thread or threads and the pile-loops of one face, and another heavy weft-thread of each set or pair occupying a position between said intermediate warp
20 thread or threads and the pile-loops of the other face, the binding weft-threads tying and indenting the pile-loops between the sets or pairs of heavy weft-threads and the binding warp-threads being interwoven with the
25 heavy weft-threads and the binding weft-threads in order to tie the two faces of the fabric together, substantially as specified.

4. A woven fabric in which sets of pile-forming warp-threads, each set comprising
30 three or more threads, alternating with binding warp-threads, are interwoven with sets or

pairs of heavy weft-threads alternating with binding weft-threads, said pile-forming warp-threads of each set forming, in some portions of the fabric, loops on the opposite faces of the same and the other thread or threads of each set not so employed occupying an intermediate position in the fabric, one of the heavy weft-threads of each set or pair being disposed between the intermediate warp
35 thread or threads and the pile-loops of one face, and the other heavy weft-thread of each set or pair being disposed between said intermediate warp thread or threads and the pile-loops of the other face, either heavy weft-
40 thread, when not so disposed, lying outside of the pile-forming warp-threads and forming a surface-thread of the fabric, the binding weft-threads tying down the pile-forming warp-threads between the sets or pairs of
45 heavy weft-threads, and the binding warp-threads being interwoven with the heavy weft-threads and binding weft-threads in such manner as to tie the two faces of the fabric together, substantially as specified. 55

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED HEALD.

Witnesses:

F. E. BECHTOLD,
JOS. H. KLEIN.