

(Specimens.)

F. W. READ.
TWO-PLY INGRAIN CARPET FABRIC.

No. 417,090.

Patented Dec. 10, 1889.

Fig. 1.

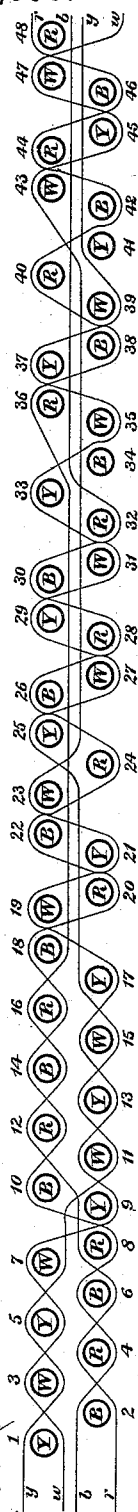


Fig. 2.

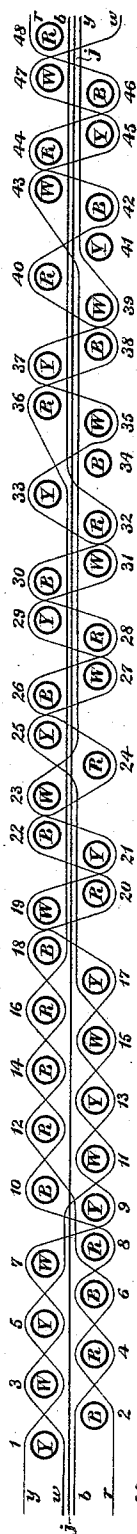
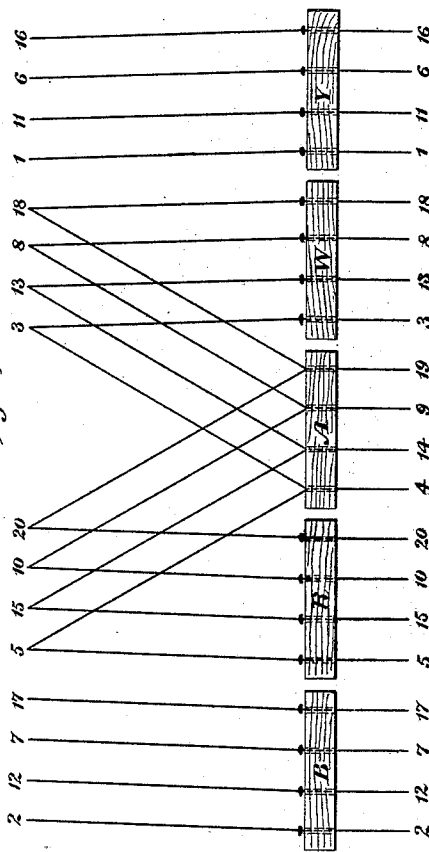


Fig. 3.



Witnesses
J. H. Breech
Edward Thorpe

Inventor
Frederick W. Read

By his Attorneys

Mittler & Kuyper

UNITED STATES PATENT OFFICE.

FREDERICK W. READ, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR OF ONE-HALF TO DAVID M. READ, OF SAME PLACE.

TWO-PLY INGRAIN CARPET FABRIC.

SPECIFICATION forming part of Letters Patent No. 417,090, dated December 10, 1889.

Application filed December 5, 1888. Serial No. 292,706. (Specimens.)

To all whom it may concern:

Be it known that I, FREDERICK W. READ, a citizen of the United States, and a resident of Bridgeport, Fairfield county, State of Connecticut, have invented certain new and useful Improvements in Two-Ply Ingrain Carpet Fabrics, of which the following is a specification, reference being had to the accompanying drawings, which form a part hereof.

The invention relates to two-ply ingrain carpet fabrics.

It has for its object the production of a carpet fabric which shall be heavier in weight and possess better wearing qualities than the ordinary two-ply ingrain carpet, and which shall be cheaper to manufacture and possess better wearing qualities than the ordinary three-ply ingrain carpet; and it consists of the composite fabric hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents the construction of weave of an ordinary two-ply ingrain carpet, being a diagrammatical representation of a section of the fabric, taken in the direction of the warp-threads—that is, a section through the weft-threads; and Fig. 2 similarly represents the construction or weave of a fabric embodying the invention and showing the same pattern and colors on the face. Fig. 3 represents part of a loom which may be conveniently employed in producing the improved fabric.

In two-ply ingrain carpeting the warp-threads, and the weft-threads as well, are divided into two portions, the one portion pertaining to one ply—to wit, the ground-ply—and the other portion pertaining to the other—to wit, the figure-ply. Thus, in Fig. 1 the yellow and white warp-threads, marked *y* and *w*, pertain to the ground-ply, and the black and red warp-threads, marked *b* and *r*, pertain to the figure-ply; similarly the yellow and white weft-threads, marked *Y* and *W*, pertain to the ground-ply, and the black and red weft-threads, marked *B* and *R*, pertain to the figure-ply. Ordinarily the warp-threads are carried in the loom all on one warp-beam, and with the same tension at all parts, and are drawn in through the harness of the loom so as to lie alternately across the width of the

loom, first a warp-thread pertaining to one ply, then a warp-thread pertaining to the other ply, and so on. Thus, for example, the warp-threads, beginning at one side of the loom, would alternate across the entire width of the loom, as follows: yellow, black, white, red, yellow, black, white, red, and so on.

The warp-threads and weft-threads which pertain to the ground-ply, considered by themselves, weave (ordinarily by the operation of two of the shafts or journals of the loom) a plain single-ply cloth, and the warp-threads and weft-threads which pertain to the figure-ply, considered by themselves, weave (ordinarily by the operation of the other two shafts or journals) a plain single-ply cloth. The weaving of these two plain single-ply cloths proceeds alternately and with equal progression in the loom—that is to say, the weaving proceeds with a pick or shot of weft-thread thrown first in one ply, then a pick in the other ply, then in the first ply again, then in the other, and so on alternately throughout the fabric. Thus in the weaving of the fabric represented in Fig. 1 the first pick or shot of weft-thread thrown was the yellow weft-thread, (ground-ply,) the second was black, (figure-ply,) the third white, (ground-ply,) the fourth red, (figure-ply,) the fifth yellow, (ground-ply,) the sixth black, (figure-ply,) and so on. In the fabric when woven the two plain single-ply cloths lie above and below each other, the one constituting the face where the other constitutes the back of the composite or two-ply fabric. In the weaving these two plain cloths or plies are (ordinarily by the operation of the Jacquard mechanism of the loom) reversed wherever desired, either in the width or in the length of the fabric—that is, the cloth or ply which formed the face is at its next pick sent to the back and the other which formed the back is brought to the face. Where a fresh card of the jacquard comes into operation at every pick of the loom, this reversal of the plies can be made at any pick of the loom, and where a fresh card of the jacquard comes into operation at every second pick of the loom the reversal of plies can be made (in the length) only at any second pick of the loom.

The reversal of the plies from front to back

and back to front of the fabric produces the design or pattern in the finished fabric, and this ingraining or crossing or reversal of the plies also produces a binding or tying together of the fabric as a whole whereby its wearing qualities are improved. Thus in the fabric shown in Fig. 1 the plies are reversed or crossed after the eighth pick or shot, again after the eighteenth, the twentieth, the twenty-second, the twenty-fifth, the twenty-seventh, the twenty-ninth, the thirty-first, the thirty-fourth, the thirty-sixth, the thirty-eighth, the forty-first, the forty-third, the forty-fifth, and the forty-seventh, the pattern effect yellow and white on the face being produced where the ground-ply is up on the face for the distance of four or more weft-threads thrown, the pattern effect black and red being produced on the face where the figure-ply is up for the distance of four or more weft-threads thrown, and the pattern effects yellow and black on the face, black and white on the face, white and red on the face, red and yellow on the face, being produced where the reversals or crossings of the plies are after every second shot for the distance of four or more weft-threads thrown. The pattern effect yellow and white is called "ground-up," because it is produced wholly by the ground-ply. The pattern effect black and red is called "figure-up," because it is produced wholly by the figure-ply. The pattern effects yellow and black, black and white, white and red, red and yellow are called "shot-about," because they are each produced by the two plies, (ground and figure,) arranged on the face-shot and shot-about. Throughout the two-ply fabric, and notwithstanding the crossing or ingraining of the plies wherever desired, the character (separately considered) of each of the two cloths or plies is maintained and preserved as a single-ply cloth of plain weave, and the composite fabric as a whole is a double-ply or double-faced fabric.

In practicing the invention I employ a set of warp-threads additional to and distinct from the warp-threads heretofore described, which additional set of warp-threads I combine in the manner hereinafter described with the two-ply ingrain fabric heretofore described. The additional set of warp-threads I prefer to carry (in the loom) upon a separate warp-beam, and to operate such separate warp-beam so that the additional set of warp-threads shall be under slightly-greater tension than the other warp-threads of the fabric.

The ordinary weft and warp threads of the improved fabric are arranged and manipulated in the weaving in the same way as heretofore described and existing, and when considered by themselves are found in the improved fabric in the same combinations and relations as heretofore described and existing. With them, however, are combined in the new fabric the additional set of warps referred to, and so combined as that the warp-threads of the additional set lie along the

middle of the composite fabric whatever reversals or crossings of the plies there may be—that is to say, the warp-threads of the additional set are so manipulated by the jacquard or other proper devices of the loom that they are raised above each weft-thread that is sent to and forms the back of the fabric wherever it forms the back of the fabric and are left down under the weft-threads which are sent to and form the face of the fabric wherever they form the face of the fabric. The warp-threads of the additional set therefore traverse the improved fabric from end to end like the other warp-threads; but, unlike the other warp-threads, the warp-threads of the additional set lie in the middle of the fabric between the face and the back whatever be the reversals or crossings of the plies and consequent changes of pattern effects and form no part of either the face or the back. They do not, therefore, pertain to either ply and are not interwoven in either plain cloth constituting the plies when separately considered. The warp-threads of the additional set may be made heavier than the other warp-threads, and may be made of cheaper material—as, for instance, of jute or cotton. They give body and weight to the fabric as a whole and cushion the face and back plies, thereby preserving those face and back plies longer against wear and tear, and are not themselves subject to wear and tear, because they do not appear either on the face or on the back of the fabric. I prefer to employ one such additional warp-thread for every four of the other warp-threads; but the number in the additional set may be greater or less than this so long as they give substantially increased body and thickness to the fabric as a whole. For instance, there may be two such additional warp-threads for every four of the other warp-threads.

In weaving the improved fabric with a thread of the additional warp, for every four threads of the original warp I preferably proceed as follows: I draw in the entire warp as follows, beginning at one side of the loom: yellow, black, white, jute, red, yellow, black, white, jute, red, and so on, the jute warp-threads being the warp-threads of the additional set carried on a separate warp-beam and under slightly greater tension than the other warp-threads. These jute warp-threads I draw in through additional harness-mails, the harness-threads of which pass through the fixed cumber-board A. (Shown in Fig. 3.) Each such harness-thread I connect by means of two neck-threads (in the manner shown in Fig. 3) to two tails or knot-cords of the jacquard—to wit, to those tails or knot-cords of the jacquard, which control, respectively, the ground warp-thread next adjacent and the figure warp-thread next adjacent in the drawing in of the warp to the particular additional warp-thread controlled by such harness-thread. This is shown in Fig. 3, where each additional harness-thread 4 9 14 19 (con-

trolling each a warp-thread of the additional set of warps) is connected above the fixed
cumber-board A and above the shafts or jour-
nals B R W Y by means of two neck-cords *a*
5 *b* to the tails or knot-cords of the jacquard,
as shown—to wit, 4 to 3 and 5, 9 to 8 and
10, 14 to 13 and 15, 19 to 18 and 20, and soon;
the knot-cords 3, 8, 13, and 18 controlling the
white warp-threads and 5, 10, 15, and 20 con-
10 trolling the red warp-threads in the drawing
in heretofore assumed, and the order of the
designating-numerals employed, representing
the order in which the entire warp is drawn
in—to wit, 1 yellow, 2 black, 3 white, 4 jute,
15 5 red, 6 yellow, &c.—repeated across the
loom. Thus, when the figure-lifter board
rises, each warp-thread of the additional set—
as, say, 4—is raised by that figure-lifter
board when the figure warp-thread adjacent
20 to it (3) is raised by that lifter-board in open-
ing a shed for a shot of the ground-ply and
similarly is left down when the figure warp-
thread is left down, and when the ground lifter-
board rises that same additional warp-thread
25 (4) is raised by that ground-lifter board when
the ground warp-thread adjacent to it (5) is
raised by that lifter-board in opening a
shed for a shot of the figure-ply, and simi-
larly is left down when that ground-warp
30 thread is left down. The tie-up is such that
the warp-threads of the additional set (4 9 14
19) are not operated at all by the shafts or
journals of the loom, but are operated only
by the jacquard or other pattern-forming de-
vice of the loom. By the tie-up described
35 the warp-threads of the additional set are car-
ried to the top of the shed wherever the weft
to be thrown is to form the back face of the
fabric and are left at the bottom of the shed
40 wherever that weft is to form the face of the
fabric; and so the warp-threads of the addi-
tional set lie along the middle of the fabric
throughout, whatever be the crossings of the
plies and whatever the pattern and color ef-
45 fects produced. Other methods of arranging
the loom and of weaving the improved fabric
may, however, be adopted.

The improved fabric, as compared with old
ingrain carpeting, is cheaper to manufacture
50 than three-ply ingrains, and has better wear-
ing qualities than either three-ply or two-ply
ingrains. Three-ply ingrain carpeting is
thick and heavy and so cushions the front
and back face; but the front and back face

have each only from nine to eleven weft- 55
threads to the inch. Two-ply ingrain carpet-
ing is not as thick and heavy as three-ply;
but the front and back face have each from
thirteen to fifteen weft-threads to the inch,
and the warp-threads also of the face and 60
back are closer than in the three-ply carpet,
whereby the separate plies forming the face
and back are closer knit or woven and so
wear better, so far as that factor is concerned,
in two-ply than in three-ply ingrain carpets. 65
The improved fabric combines the close-
woven face of two-ply with the cushioned
face of three-ply ingrain carpets. Moreover,
the present invention has a tendency to im-
prove the coloring and figuring of the goods, 70
for in those parts of the pattern where the
ingraining of the plies is most frequent and
so where fabric has a tendency to be drawn
more tightly together and the weft-threads of
one face to be somewhat too closely drawn 75
toward or into the other face, the present in-
vention will fill out such parts of the carpet
and maintain the surface at such places, as
well as the more loosely woven bag-like or
purse-like portions, all of an even and smooth 80
surface, and this circumstance will also im-
prove the wearing qualities of the fabric as
a whole. Again, at those portions of the
fabric where what is technically known as
“gazing” would occur—that is to say, where 85
by reason of gaps on the one side of the fab-
ric the other face of the fabric shines through
or could be seen through—at such places the
additional set of warps would prevent such
gazing of the under face of the fabric and so 90
would prevent the sometimes hurtful effect
of such gazing upon the general color-effect
of the face.

The invention may be embodied in rugs,
art squares, and other fabrics which are sub- 95
stantially in construction of weave a two-ply
ingrain fabric, as heretofore described.

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

A two-ply ingrain carpet fabric having an 100
additional set of warp-threads lying along the
middle of the fabric, substantially as shown
and described.

FREDERICK W. READ.

Witnesses:

CHESTER W. BENNETT,
DAVID F. HOLLISTER.