(Specimens.)

W. B. KEEFER.

INGRAIN CARPET FABRIC.

No. 424,308. Patented Mar. 25, 1890.

Fig. 1

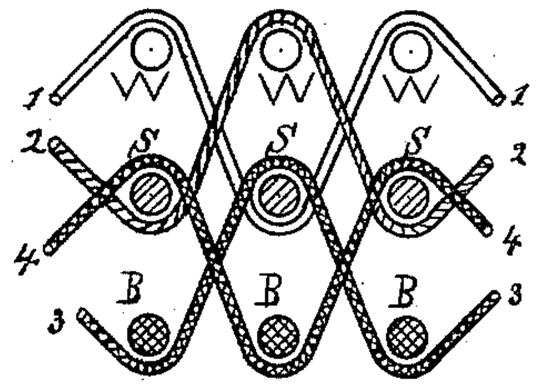


Fig. 2

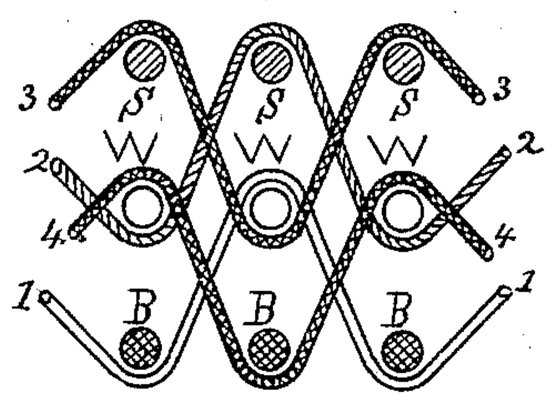


Fig. 3

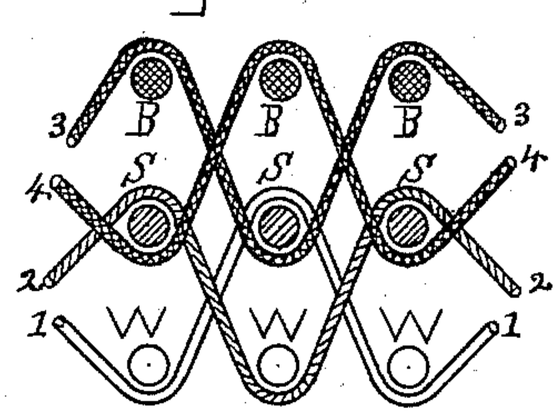
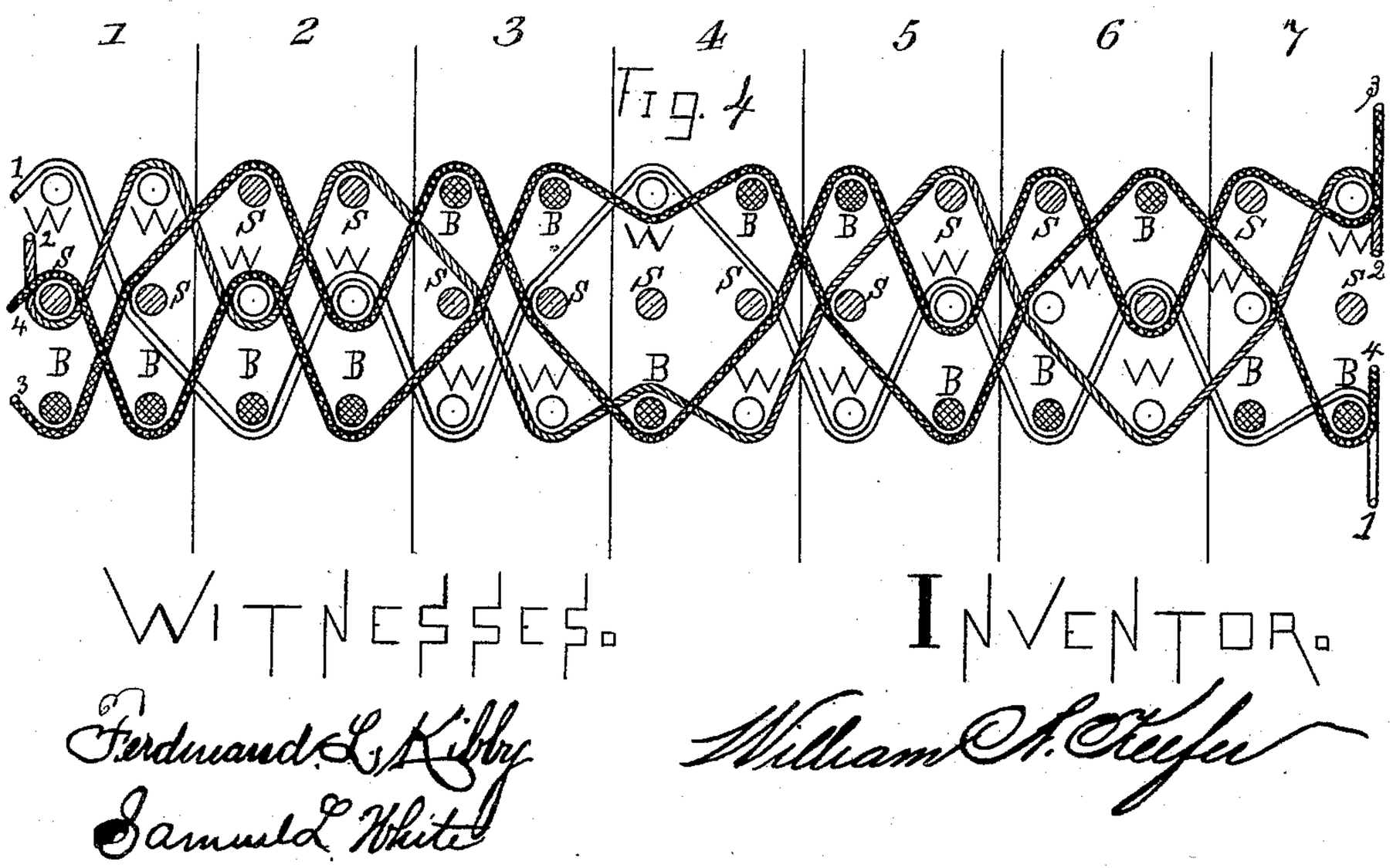


Fig. 4



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INGRAIN-CARPET FABRIC.

SPECIFICATION forming part of Letters Patent No. 424,308, dated March 25, 1890.

Application filed October 9, 1889. Serial No. 326,393. (Specimens.)

To all whom it may concern:

Be it known that I, WILLIAM B. KEEFER, a citizen of the United States, residing at Germantown, in the city and county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Ingrain-Carpet Fabrics, which improvement is fully set forth in the following specification and accompanying drawings.

My invention belongs to a class of carpets known to the trade as "ingrains." The old method of weaving a two-ply ingrain carpet requires four figuring and binding weft-threads and four warp-threads in a set or weave. In a three-ply, six figuring and binding weft-threads and six warp-threads are required to a set or weave. All two-ply and three-ply ingrains are woven by the jacquard, two-ply ingrains being woven with four rising and falling journals, and one card being used for each two shots of weft, while in the weaving of a three-ply six journals and one card for each shot of weft are employed.

My invention consists in a fabric of the improved construction hereinafter fully described, and specifically set forth in the claim, it resembling in appearance a three-ply ingrain carpet, but having six weft-threads and four warp-threads in a set, and, although containing one-third less warp-threads and made at much less cost, being nearly if not quite as good as a three-ply carpet made in the ordinary way.

In the accompanying drawings, making a part of this specification, Figure 1 is a diagram showing a combination of nine shots of weft-threads or one complete set of weft-threads and half of a second set and four warp-threads. Figs. 2 and 3 are diagrams showing the same number of shots, but with the weft and warp threads placed in different positions. Fig. 4 shows a combination of forty-two shots of weft-threads and four warp-threads.

Similar letters and numbers refer to similar threads in the several figures.

The colors of the weft-threads shown in the drawings may be supposed to be as follows: W, white; S, scarlet; B, blue. The warp-threads may be supposed to be of the following colors: 1, white; 2, scarlet, and 3 and 4 blue. It is to be understood that the colors of the weft and warp threads can be varied in sets to produce the shading desired in the design, and that since each set of wefts is composed of six weft-threads any number of colors of wefts up to six may be employed in each set.

In the drawings I have represented each set of wefts as composed of two white wefts, two scarlet wefts, and two blue wefts, the object in using two of each color being to secure solid color effects. In practice five different colors have been employed by me with good results—as, for instance, white, olive, red, olive and gold twisted together, (olive twist,) and black, the white being introduced twice. It is to be understood, therefore, that the colors of wefts illustrated have been merely arbitrarily selected, and it is so also with the colors of the warp-threads, the colors assigned thereto herein having been selected for convenience of explanation and because they agree with the colors of the wefts. Obviously there need not be the two blue warp-threads or two of any other color, unless desired, for, instead, one of the said two may be replaced by a warp-thread of a different color.

In arranging the warp in the loom-harness I prefer a loom with four journals, which is the same as a "comber-board" divided into four parts. The warp is divided into four parts, one part being composed of the white threads and placed under the control of the harness-cords passing through one journal, another part being composed of the scarlet and being placed under the control of the cords passing through a second journal, and the other two parts being composed of the blue warp-threads and being placed under the control of the cords in the remaining two journals.

The design to be woven is cut on the cards, one card being used to each shot of weft. The journals do not move, but are stationary, serving merely as guides for the harness-cords, and the warp-threads are moved solely by the jacquard as controlled by the cards. In the various diagrams in the drawings the shots of weft on the left-hand side are supposed to be put in first. If a hand-loom be used or a power-loom that will "call" any

pick at will, the shots of weft may be thrown in regular succession.

Figure 1 shows a combination of threads in which three white wefts W appear in the upper plane bound by white and scarlet warp-threads 1 and 2 alternately, three scarlet wefts S in the middle plane, and three blue wefts B in the bottom plane, bound by the blue warp-threads 3 and 4 alternately.

Fig. 2 shows a combination of threads in which three scarlet wefts S appear in the upper plane bound by blue and scarlet warp-threads 2 and 3 alternately, three white wefts W in the middle plane, and three blue wefts B in the bottom plane, bound by white and blue warp-threads 1 and 4 alternately.

Fig. 3 shows a combination of threads in which three blue wefts B appear in the upper plane bound by blue warp-threads 3 and 4 alternately, three scarlet wefts S in the middle plane, and three white wefts W in the bottom plane, bound by white and scarlet warp-threads 1 and 2 alternately.

These three diagrams illustrate portions of fabric in which the same color of weft appears consecutively for a number of picks in the same plane, and are intended to display clearly the manner in which the respective wefts are combined with the respective warp-threads in the different positions which the wefts occupy in the fabric.

It will be seen that in Fig. 1 on the face of the fabric the first white weft is bound by the white warp-thread and the second is bound by the scarlet warp, the latter harmonizing with the said second weft more closely than the blue warps, while on the back thereof the first blue weft is bound by one blue warp-thread and the second blue weft is bound by the other blue warp-thread. In Fig. 2 on the face of the fabric the first scarlet weft is bound by blue warp-thread 3, and the second scarlet weft is bound by the scarlet warp-thread, and on the back the first blue weft is bound by the white warp-thread, while the second blue weft is bound by the blue warp-thread 4, and in Fig. 3 on the face of the fabric the first blue weft is bound by blue warp-thread 3, and the second by blue warp-thread 4, while on the back the first white thread is bound by the white warp-thread and the second white weft is bound by the scarlet warp-thread. In other words, every color of weft where it appears on either face is bound by a warp-thread of the same color or else by that color most fully harmonizing therewith.

Fig. 4 is a diagram intended to illustrate the manner in which the wefts and warp-threads may be varied in position in the fabric in producing a pattern, and it can readily be traced to ascertain what wefts and warp-threads are on top, what wefts and warp-threads are in the middle, and what wefts and warp-threads are on the bottom.

It will be understood by skilled weavers that by the aid of the Jacquard machine and a pick-and-pick loom that will "call" any shuttle or weft at will, the weft and warp threads may be interwoven to produce shading effects. The wefts not wanted on either the face or the back of the fabric are thrown to the middle thereof.

The wefts are introduced in sets of six each, as above referred to, for the reason that the introduction of six wefts is necessary to complete each round in the interweaving and to secure proper binding of the wefts into a solid and homogeneous fabric. Thus in Fig. 1 the first shot of white weft in the top plane is bound by the white warp-thread 1, the first shot of blue weft in the bottom plane is bound by the blue warp-thread 3, the second shot of white weft in the top plane is bound by the scarlet warp-thread 2, and the second shot of blue weft in the bottom plane is bound by the blue warp 4. Now, while the first pick of white weft and first pick of blue weft are bound by warp-threads 1 and 3 passing above and below the same, respectively, the warp-threads 2 and 4 pass on opposite sides of the first shot of scarlet weft. Also, while binding the second shot of white weft in the top plane and the second shot of blue weft in the bottom plane by warp-threads 2 and 4, respectively, the warp-threads 1 and 3 are passed to the middle of the fabric and around the second scarlet weft in opposite directions, as shown. The positions for the succeeding six wefts will be repetitions of these just described. It will be apparent that the same thing is true when applied to Figs. 2 and 3 respectively.

The particular arrangements of threads represented in Figs. 1, 2, and 3, are of course not visible throughout the fabric, inasmuch as the varied disposition of the wefts, both transversely and longitudinally of the fabric, made necessary by the various pattern effects to be produced, involves altered arrangements of the warp-threads, but the principle of construction remains the same throughout, owing to the requirement of an effectual binding of the face or back wefts into the fabric structure.

In Fig. 4 the arrangement of the warp-threads and the wefts in the first set, beginning at the left, is the same as that represented in Fig. 1. The arrangement in the second set will be seen to be that represented in Fig. 2, and the arrangement in the third set will be seen to correspond with that represented in Fig. 3, while in the remaining sets 4, 5, 6, and 7 are represented various combinations producing shot-about effects.

In each of Figs. 1, 2, and 3, wefts of the same color appear on the same surface of the fabric for a number of shots, and consequently the consecutive shots of weft on each surface are bound by the same pair of warp-threads, the latter appearing on the said surface alternately. In the said figures the top and bottom wefts are bound to the middle weft by the passage of the warp-threads in opposite directions around the said middle

weft, and the fabric has its different planes of weft closely bound together and is without pockets.

In Fig. 4, in changing from the arrangement of Fig. 1 to that of Fig. 2, or otherwise from one of the simple arrangements represented in Figs. 1, 2, and 3 to another thereof, the respective warp-threads, instead of passing from the outside of one weft on one surface of the fabric to and around the middle weft and back to the same surface, continue across to the other surface, where they appear outside the outermost weft. This results from the transfer of the different wefts, respectively, from one position in the fabric to another, and from the necessity of binding each weft, particularly when it appears on the upper face of the fabric, by a warp-thread of the same or of a harmonizing color. In Fig. 4 the fabric is still without pockets. I thus arrange the warp-threads so as to extend from the two surfaces of the fabric in opposite directions around the middle wefts, as in Figs. 1, 2, and 3, and also from one surface of the fabric to the other with approximate directness, so as to bind the three planes of wefts closely and compactly together, whatever may be the character of the figure or pattern appearing on the faces of the fabric. This result will be secured, even though in one or two sets at intervals, instead of carrying the warp-threads from the surfaces in opposite directions to and around the middle weft-threads, the warp-threads being disposed as in set 4 of Fig. 4, although in practice I shall adopt the arrangement of the said set only in exceptional cases, if at all.

It is to be distinctly understood that the colors mentioned in referring to the threads in the foregoing description have been selected arbitrarily and for the purpose of facilitating the explanation of the invention. In practice any desired variety of colors may be employed.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

An ingrain-carpet fabric having three weft-planes, and composed of warp-threads and figuring-wefts in sets, each comprising six figuring-wefts and four warp-threads, and having the warp-threads passed from the two sides of the fabric in opposite directions to and around said middle wefts, and also from one surface to the other throughout substantially the whole extent of the fabric, to bind the threads securely into a homogeneous fabric without pockets, substantially as described.

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Witnesses:

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JOHN A. WIEDERSHEIM.