

(Specimens.)

2 Sheets—Sheet 1.

W. G. HARRE & M. M. HUTT.
INGRAIN CARPET FABRIC.

No. 508,106.

Patented Nov. 7, 1893.

Fig. 1.

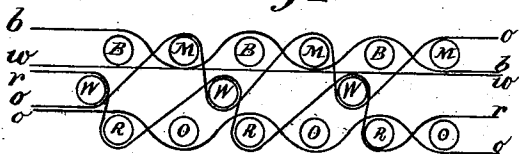


Fig. 2.

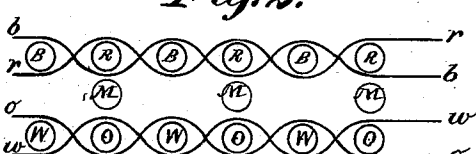


Fig. 3.

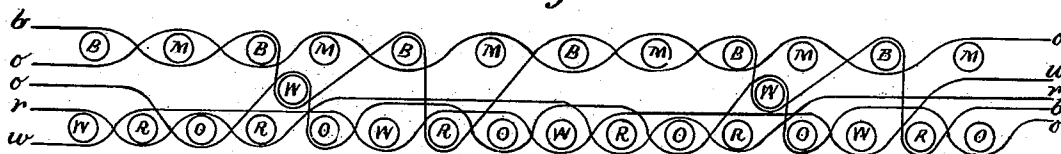


Fig. 4.

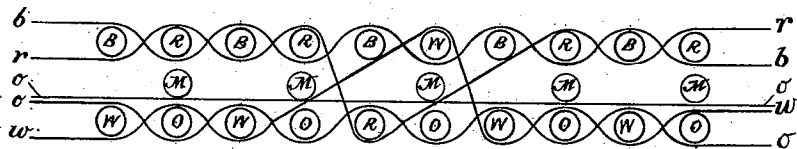


Fig. 5.

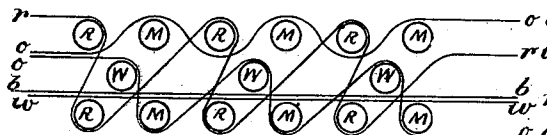


Fig. 6.

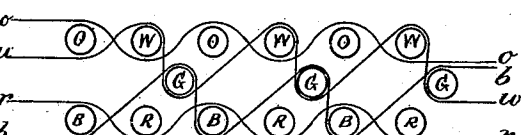


Fig. 7.

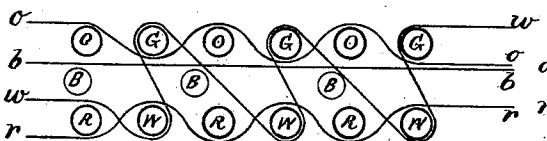
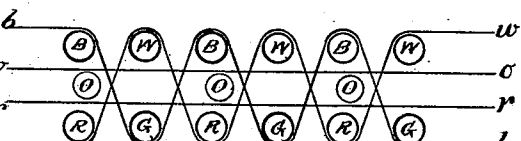


Fig. 8.



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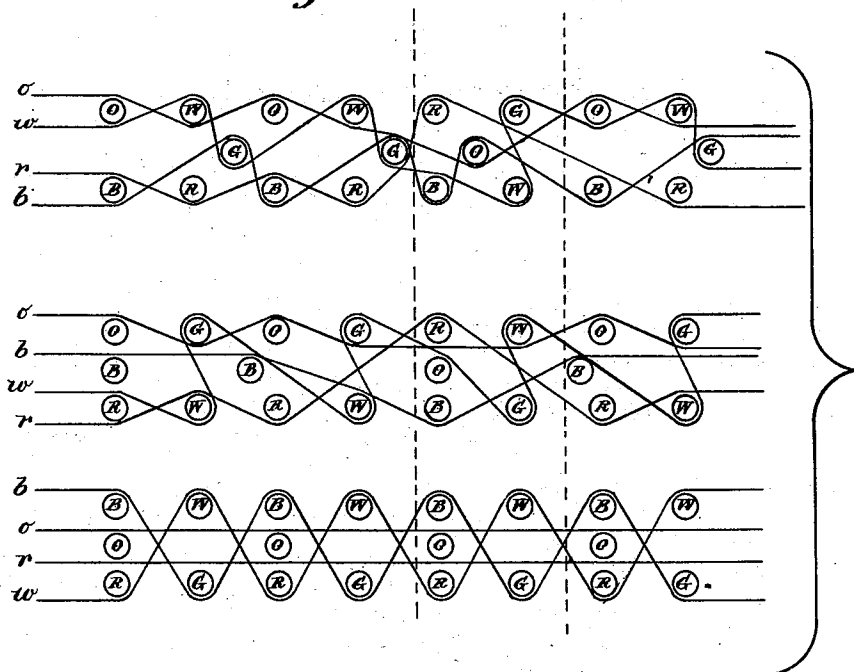
2 Sheets—Sheet 2.

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Fig. 9.



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UNITED STATES PATENT OFFICE.

WILLIAM G. HARRE AND MAHLON M. HUTT, OF YONKERS, NEW YORK.

INGRAIN CARPET FABRIC.

SPECIFICATION forming part of Letters Patent No. 508,106, dated November 7, 1893.

Application filed December 16, 1889. Serial No. 333,914. (No specimens.)

To all whom it may concern:

Be it known that we, WILLIAM G. HARRE and MAHLON M. HUTT, citizens of the United States, residing at the city of Yonkers, county of Westchester, and State of New York, have jointly invented certain new and useful Improvements in Ingrain Carpet Fabrics, of which the following is a specification.

Our inventions relate primarily to ingrain carpets although they may be employed in any analogous fabric, and they consist of certain novel parts and combinations, composing an improved ingrain fabric, or parts of a fabric, which novel parts and combinations we will specifically and separately point out in the claims concluding this specification.

We will now describe the pieces of carpets which are illustrated in the accompanying drawings, the several figures of which show different fabrics, each embodying one or more of the several inventions which we desire to protect by these Letters Patent.

Our inventions are not limited to the forms shown and herein described, as a person skilled in the art will readily understand, for the warps and wefts may be combined in a large variety of forms not shown, without departing from the spirit of our invention or the scope of the claims annexed hereto, the object of the drawings and the descriptive part of this specification being to instruct those skilled in the art to employ our inventions practically and to understand their nature, and we shall make no endeavor to describe here how to employ our inventions in making elaborate designs, because this information is possessed by any skilled weaver in ingrain carpets and has nothing to do with our present invention.

All the figures of the drawings show longitudinal sections through pieces of carpet, and some of them through the same piece at different places. The circles inclosing capital letters indicate weft or filling threads, and the lines with small reference letters indicate warp or binding threads, in all the figures of the drawings. In all the figures the letter B indicates a black weft thread, the letter W a white weft thread, the letter R a red weft thread, the letter O an olive weft thread, the letter M a moresque weft thread, and the letter G a green weft thread. So also in all the

figures the lines marked *r*, *w*, *o*, *b*, represent, respectively, red, white, olive, and black warp threads.

Referring to Figure 1, it will be observed that the weft threads are dyed black, white, red, olive, and moresque. They are shot in the order named. It will also be observed that on the upper face the black weft threads are covered by black warps and the moresque weft threads by olive warps, while on the back the red weft threads are covered by red warps and the olive weft threads by olive warps. Each weft is, therefore, covered by a warp of appropriate color. Each side of a carpet woven in this way may, therefore, be said to be a face, and such a carpet is, properly speaking, reversible. It will also be observed that there is in Fig. 1 also a white weft thread which is held between the upper and lower plies of the carpet, and that there is a corresponding white warp thread which is idle, that is, appears on either face. This extra weft thread passes beneath the red warp threads from the under face of the carpet and over the olive warp thread from the upper face. In other words, the olive warp crossing the moresque weft of the upper ply passes under the white weft thread between the points where the said olive warp appears on the face of the fabric, and the red warp crossing the red weft in the lower ply passes over this white weft between the points where the said red warp appears on the under face of the carpet. The effect of this is to knit the two plies together into a solid body.

In Fig. 2 the same five weft threads are employed but with only four warp threads. In this figure no warp threads from either ply pass around the moresque thread and the said plies are, therefore, not bound together, but are entirely independent of each other. The presence of the extra weft pads these "floats," as they are termed, and elevating them above the surrounding surfaces, gives an effect to the design which in some cases is preferred. It will also be observed that the interior weft thread in Fig. 2 is the moresque and not the white, as in Fig. 1. In this figure (2) the wefts are shot in the same order as in Fig. 1, and it illustrates a plain figure on top and plain ground underneath woven in the ordinary way, combined, however, with

an extra or fifth (moresque) thread, which may be thrown to either face when desired to produce new effects.

In Fig. 3 is illustrated a piece of fabric containing the same weft threads as are shown in Fig. 1 and they are shot in the same order. It also has the same five warp threads as are shown in Fig. 1. Although the weft threads are shot in sets of five, one of the threads is not constantly held between the plies but appears at some places on the under face of the carpet, while at other places it is buried between the plies. In those places where it is not buried it is brought side by side with the other two weft threads of the same series shot on the under side of the fabric, so that beneath three weft threads occupy the same space as two weft threads on the top. Where the white thread is buried it is utilized to bind the two plies together in the manner shown in Fig. 1. The fabric shown in this figure (3) does not embody in every set of wefts our present invention. At those parts where there are two wefts on one face and three wefts on the other, a form of weave old and well known is shown. In two sets, however, shown in said figure, one of the five weft threads composing the set is buried and in these sets our invention is present. At a point in the figure between the two buried weft threads the plies are bound together by a black warp passing over a black weft on the upper face and under a red weft on the lower face. This figure illustrates a fabric in which certain features of our present invention appear, but only in parts of the fabric.

The warp and weft threads in Fig. 4 are the same as those in Fig. 1 and the wefts are shot in the same order. The moresque thread is held between the plies. The plies are at one point bound together by means of warp threads each passing from one ply to the other to cover its corresponding weft thread when it is transferred to the opposite ply. One of the olive warp threads is idle and does not appear on either face.

In Fig. 5 the weft threads are red, white, red, and moresque, and are shot in the order named. The warp threads are the same as shown in Fig. 1. In this figure the red warp thread passes from one ply to the other and in doing so, passes beneath the concealed white thread and the red weft thread of the under ply. One of the olive threads passes under the moresque threads of the under ply and over the interior white thread. The plies are thus bound together. The black and white warps are idle and appear on neither face.

In Fig. 6 the wefts are black, olive, red, white and green, and are shot in the order named. The warp threads are black, white, olive and red. The construction of the fabric illustrated in this figure is exactly like that illustrated in Fig. 1, with the omission of the fifth warp thread.

The warps and wefts of Fig. 7 are the same

as shown in Fig. 6, and the wefts are shot in the same order. But in this case the black weft is held between the plies, whereas in Fig. 6 the green weft occupies such position. The plies are bound together by a white warp passing from one face to the other under a white weft and over a green weft. The black warp is idle.

The warps and wefts of Fig. 8 are the same as those in Fig. 6 and the wefts are shot in the same order. This figure illustrates the weaving of an ordinary shot-about effect, in which the weft threads of the lower ply, or back of the carpet, are not crossed by warps of their own or appropriate color, and in which the plies are bound together by warp threads passing from one ply to the other. It has, however, a fifth thread held between the plies, which may be thrown to either face, as occasion may require, to produce desired effects.

In this figure the red and olive warp threads do not appear on either face, but are concealed between the plies.

Fig. 9 shows three longitudinal sections taken at different points in the width of the fabric, the weft threads shown being the same identical weft threads in each section of the figure. The warps and wefts of Fig. 9 are the same as those of Figs. 6, 7, and 8, and the wefts are shot in the same order. Omitting from consideration that part of the figure which is included between the dotted lines 1, 1 and 2, 2, this figure shows the manner in which a given weft thread is sometimes buried and sometimes thrown to one face or the other. In the lower section of said figure, the olive weft is buried; in the middle section the black weft is buried; and in the upper section the green weft is buried. Considering that portion of the figure which is included between the dotted lines 1, 1 and 2, 2 it will be observed that in each section the olive weft is buried, although in the upper section the red and green wefts appear on the face, and black and white wefts on the back; while in the middle section red and white wefts appear on the face and black and green wefts on the back; while in the lower section black and white wefts appear on the face and red and green wefts on the back. These three sections illustrate how some of the weft threads appear at places in one or the other of the outside plies to produce color effects and how others are concealed throughout their entire length between the plies, when not required in the design.

In looms and machines for weaving two-ply ingrain carpet, as they are ordinarily constructed, it is impossible to control the warps in such a way as to have in all effects, on both sides of the fabric, a given weft always crossed by a warp of the same or appropriate color. In other words, the construction of the ordinary carpet loom and Jacquard machine imposes certain definite limitations which make it impossible to bring any warp to either face

of the carpet at any desired point. All the fabrics shown in the annexed figures of the drawings could not, therefore, be made on a carpet loom as ordinarily constructed. If, however, we dispense with the usual harness shafts or journals of the loom and control all of the warp threads for each shot of the weft by means of a single lifter board, each needle operating only one color of warp, these difficulties and limitations disappear and any warp may be brought to either face of the carpet at any time and each weft, as it is shot, can be forced into the desired position, either on the upper or lower face, or between them. We prefer to make carpets embodying our inventions on machines constructed in this way, because it enables us to obtain all the possible effects which the combination of five threads can give on both faces of the fabric and to have each weft crossed by a warp of the same, or any other desired color. Our inventions, however, do not in any way relate to the modifications of the Jacquard machine and loom above indicated, and we shall not, therefore, describe such modifications in detail, as they are well-known in the art and our inventions may be employed in looms differently constructed, while the above description is sufficient to enable a person skilled in the art to modify an ordinary loom so as to make it capable of working our invention. This alteration of the loom requires, of course, a corresponding modification of the Jacquard cards, which should be cut to suitably control all the colors at each shot of the weft.

Our invention, in one aspect, consists of an ingrain fabric, the weft or filling threads of which are in sets of five, two forming the upper ply, two the lower ply and the fifth being held between said plies. This we intend to cover broadly irrespective of the other features of improvement shown, and irrespective of the specific manner in which the warps are controlled. Thus in Figs. 2 and 8 of the drawings are shown ingrain carpets woven in the ordinary way, and yet they contain the extra fifth weft thread between the plies. The fifth thread might, if preferred, where it does not appear at all on either surface of the fabric be made of a material cheaper than that composing the extra wefts and still add weight, thickness and firmness to the fabric. It will be understood that in fabrics where all the weft threads appear at some point or other on one surface or other of the same the fifth thread referred to is the one which at a given point is held between the plies and that as one color after another is buried in making designs each color is in turn, or at different parts of the fabric, the extra or fifth weft within the meaning of this specification.

Another important feature of our invention consists in having such fifth thread at places appearing on the face of the carpet, displacing one of the other face wefts, said displaced weft being then buried between the plies.

Another important feature of our invention consists in employing said extra weft to knit the plies together in any suitable manner irrespective of its other functions.

Another important feature of our invention consists of a fabric having an inner half-ply composed of one-half the number of threads in each of the outside plies, some of said threads appearing in places in one of the outside plies to produce color effects and some being concealed throughout the entire width to make a uniform fabric throughout. In other words, our fabric, in this aspect, is to be distinguished from a carpet in which at intervals, and only where an extra color is desired in the design, an extra weft is shot, such extra weft being omitted where the extra color is not required in the design. This produces an irregular or ribbed carpet, which is, in reality, a two-ply carpet in stripes and a three-ply carpet in stripes. We prefer to shoot the extra weft in each set, whether it is brought to the face to form part of the design, or whether it is not brought to the face. This is illustrated by Fig. 9.

Other features of our invention will be pointed out in the concluding claims.

In ordinary two-ply ingrain carpets, the wefts are shot in sets of four, two appearing on one face and two on the other face of the fabric. In ordinary three-ply ingrain carpets, the wefts are shot in sets of six, two appearing on one face, and two on the other face of the carpet, two being held between the plies. In our invention the wefts are shot in sets of five, two appearing on the face and two on the back of the carpet, one being held between the plies. Our carpet, therefore, may properly be termed a two-and-a-half ply carpet. Two-ply ingrain carpets have heretofore been made in which the wefts are shot in sets of five, but in these carpets all the wefts constantly appear on the faces, three wefts on one face occupying the same space as two wefts on the opposite face on the general plan shown in some portions of Fig. 3. We do not, therefore, claim broadly a carpet in which the wefts are in sets of five.

In Figs. 1, 3, 4 and 5, five warp threads are shown. If the five weft threads employed be all of different colors and it is desired that each weft thread, wherever it appears on either face, be covered by a warp of its own color, it is obvious that the employment of five warp threads is necessary, provided all the colors at intervals are thrown to the face. The employment of five warps is not, however, practically speaking, at all essential, because usually two of the weft colors may be appropriately crossed by the same colored warp; and it will be observed that in Figs. 2, 6, 7 and 8 only four warps are shown. Again, if the fifth weft be employed, as it may be, merely to add strength and body to the fabric or for the purpose of knitting the two plies together and therefore is constantly or usually concealed, this fifth weft may be made of a

cheaper material than the others and with only four warps each face weft can be, if desired, always covered by a warp of the same color. In general it may be stated that the number of warps whether four, or more, or less, is, to a considerable degree, a question of taste, convenience or economy.

As we have remarked, another prominent advantage which results from the use of an extra interior weft is the facility which it affords for binding the two plies of the carpet together wherever desired and throughout the entire fabric, if preferred. In ordinary two-ply ingrain carpets the plies are separate, or not bound together, wherever there is a plain ground on one side and a plain figure on the other. Both faces of the carpet at such points have each weft crossed by a warp of the same color. In such carpets the plies are bound together where shot-about effects appear on both sides, but then on one face the wefts are not crossed by warps of the same color. If the loom be modified, as it might be, to have in shot-about effects the wefts on both sides crossed by warps of the same color, then the plies will not be bound together but would be "floats," as in the plain ground and figure above referred to. By the use of a fifth interior weft thread we are able to bind the plies together at every point and still cross each weft by a warp of appropriate color, for, referring to Fig. 2, it will be seen that the black warp thread could be made to pass below, instead of above the interior moresque, and the white warp thread could be made to pass above, instead of below the said interior moresque, and that this were done the plies of the carpet of Fig. 2 would be bound together in substantially the same way as are the plies of the carpet in Figs. 1 and 6. Of course the plies may be bound together, as we have said, by means of threads passing from one ply to the other at some points, but it is a function of our fifth thread to make it possible to bind the carpet together, even where the warp threads of one face of the carpet do not appear on the opposite face.

In the drawings we have not endeavored to illustrate any given design embodying our inventions but have only shown a few constructions in which our inventions are present in different forms. These are sufficient to enable any one skilled in the art to embody our inventions in any required designs and with any desired effects. If the interior thread be used, as we prefer to use it, to obtain effects at any given point that thread will be buried (and will be for the time being what we have termed the fifth or extra weft) which is to be omitted from the design on both sides. Thus a single white weft running the width of the fabric may be at one point placed in the upper ply, in another place in the lower ply and in another place between the plies. The same is true of each of the other wefts, and in this way designs

showing all the possible effects which can be produced by the combination of five threads may be displayed across the fabric by the combination of the same five threads. This is indicated in the drawings if we consider Figs. 1, 3 and 4 as parts of the same fabric and as showing the same weft threads. At one place the white and at another place the moresque is between the plies. Figs. 6, 7 and 8 may be read together to indicate the same thing. At one place the green, at another place the olive and at another place the black is between the plies. If the same groups of figures be read as showing the same warps but different wefts, they show the way the warps are worked to produce different effects longitudinally through the fabric. Of course, any given piece of carpet will show many different forms of construction consisting, perhaps, of the combination in substance of all the forms shown in the drawings having an equal number of warp threads and of many others besides, as will be readily understood by any person skilled in this art.

The use of a fifth weft thread in the manner described considerably increases, as we have said, the possible number of effects which may be obtained on both faces of the fabric. With five weft colors to be manipulated at will, it is obvious that ten different effects may be produced. Thus, supposing the wefts to be black, olive, red, white and green, we may combine on either face the black with olive, or black with red, or black with white, or black with green, or olive with red, or olive with white, or olive with green, or red with white, or red with green, or white with green. Again, considering both faces of the carpet we may have either one of three different effects on the back of the fabric for each effect on the face; as, for example, with a black and olive effect on one side, we may have either red and white, or red and green, or white and green, on the opposite side. If desired, in each of these thirty total combinations each weft can be crossed by a warp of its own color, or of any desired color. It will also be readily seen that three-ply effects can be very nearly approached in our improved carpet by making two or more of the wefts of the same color. Thus, supposing we have two red wefts and one olive, one green, and one white, we can then have a solid red figure on either face of the carpet with six other effects, viz., red and white, red and olive, red and green, white and olive, white and green, and olive and green. If, to still more nearly approach three-ply effects, it be desired to have two solid colors, such as red and olive, we may employ two red wefts, two olive wefts and one green weft; in which case, beside the solid red and olive figures on both faces, we could produce three other effects: to wit, by a combination of red and green, red and olive, and green and olive.

Besides the effects above indicated still others may be produced by crossing a weft

with warps of contrasted color or by using illuminated warps, that is, warps composed of threads of different colors twisted together. Of course it will be understood that different forms of weaving will control the position of the extra weft, bringing it nearer one ply than the other, keeping it exactly in the middle of the fabric, placing it in a diagonal relation to all the other wefts of the set, or holding it immediately between opposite threads.

In the consideration of this specification it will be understood that many of the details and combinations illustrated and above described are not essential to our several inventions separately considered. This will be indicated in the concluding claims, where the omission of an element illustrated or described, or the omission of reference to the particular features of the elements mentioned, is intended to be a formal declaration of the fact that the omitted element or features are not essential to the invention covered by the particular claims under consideration. The language of the claims is intended to cover the application of our invention to analogous fabrics, as well as to ingrain carpets. We do not limit our claims to a fabric in every part of which our invention appears but cover a fabric of any description in any part or parts of which one or more of the novel features of our inventions are present.

Having thus described fabrics embodying our invention, what we separately claim, and desire to secure by these Letters Patent, is—

1. In an ingrain fabric, the combination with warp threads of weft threads in sets of five, two of which weft threads are in the upper plane or face, two in the lower plane or back, and one between the two said planes.

2. In an ingrain fabric, the combination with warp threads of weft threads in sets of five, two of which weft threads are in the upper plane or face, two in the lower plane or back and the fifth held between said planes, said fifth weft appearing at places in an outside plane to produce color effects, displacing one of the other colors, which is there concealed in the interior of the fabric.

3. In an ingrain fabric, the combination with warp threads of weft threads in sets of five,

two of which weft threads are in the upper plane or face, two in the lower plane or back, and one between the two said planes, the wefts on both said planes being crossed by warps of their own or appropriate color.

4. In an ingrain fabric, the combination of weft threads in sets of five, two of which weft threads are in the upper plane or face, two in the lower plane or back and one between said two planes, with warp threads passing from one plane to and around the intermediate weft and back to the same plane without crossing to the other side of the fabric.

5. In an ingrain fabric, the combination with warp threads of weft threads in sets of five, two of which weft threads are in the upper plane or face, two in the lower plane or back, and one between the two said planes, which last-mentioned weft thread binds the plies together by passing over some of the warp threads from the upper plane and under some of the warp threads from the lower plane.

6. In an ingrain fabric, the combination of weft threads in sets of five, two of which weft threads are in the upper plane or face, two in the lower plane or back, and one between the two said planes, with warp threads, some of which pass from an outside plane to and around an intermediate weft and back again to the same plane, without crossing to the other side of the fabric, and others of which pass directly from one weft in an outside plane to another weft in an outside plane without passing around said intermediate weft.

7. In an ingrain fabric, the combination with warp threads of weft threads in sets of five, two of which weft threads are in the upper plane or face, two in the lower plane or back, and one between the two said planes, said planes being bound together in part by warp threads passing from one plane to the other and in part by warps from both planes passing in opposite directions to and around the intermediate weft and back to their own plane without crossing to the other plane.

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