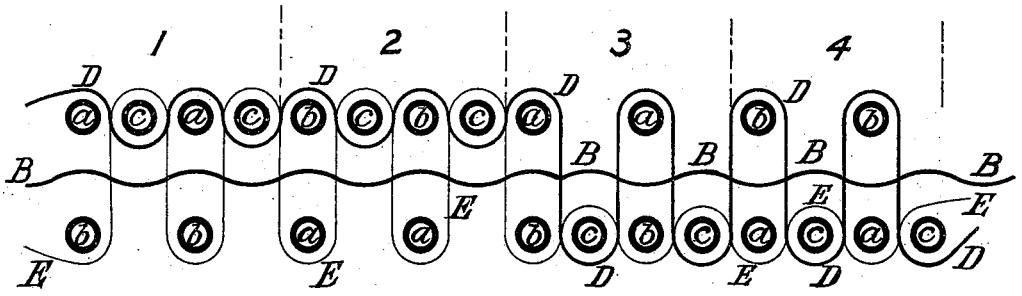
No. 649,107. Patented May 8, 1900.

T. F. & A. NAYLOR.

INGRAIN CARPET FABRIC.

(Application filed Aug. 25, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

THOMAS FOX NAYLOR AND ARTHUR NAYLOR, OF KIDDERMINSTER, ENGLAND.

INGRAIN CARPET FABRIC.

SPECIFICATION forming part of Letters Patent No. 649,107, dated May 8, 1900.

Application filed August 25, 1898. Serial No. 689,504. (No specimens.)

To all whom it may concern:

Be it known that we, THOMAS FOX NAYLOR and ARTHUR NAYLOR, subjects of the Queen of the United Kingdom of Great Britain and Ireland, residing at Green street, Kidderminster, in the county of Worcester, England, have invented certain new and useful Improvements in Kidderminster, Scotch, or Ingrain Carpet Fabrics, of which the following is a specification.

Our invention relates to improvements in that class of carpet fabrics known as "Kidderminster," "Scotch," or "ingrain" carpets, the object being to insert a smaller number of wefts than is usually employed.

The present invention is an improvement upon the invention described in the specification to British Letters Patent No. 11,692 of 1895, having the same object in view.

In the further description of this invention reference is made to the accompanying drawing, which shows a longitudinal section of a four-color carpet fabric taken in the direction in which it is woven.

The figure shows a carpet fabric having a black stuffer-warp marked B, and built upon it in the manner fully described hereinafter are top and bottom planes or plies of weft, the shots of which are respectively indicated by *a*, *b*, and *c*, arranged in various positions. The letters D and E indicate the binding-warps, which are either stamped for in order to be worked by the jacquard or harness, or they may be operated by two heddles or gears, as their movement is in a regular order, D always lifting twice to E lifting once in this formation of fabric. The digits 1, 2, 3, and 4, placed at the top of the figure, each indicate a short length of the fabric to show various combinations of wefts on the face, as in 1. The wefts *a* and *c* are brought up side by side on the face or upper surface of the fabric. In 2 *b* and *c* are brought up side by side. In 3 the weft *a* and the uncovered stuffer-warp B show together on the upper surface, while in 4 the weft *b* and the uncovered stuffer-warp B show side by side on the face of the carpet. This is a simple form of our improved fabric, giving four combinations of colors on the face of the carpets with opposite colors on the back, and is therefore a reversible fabric.

The ordinary Kidderminster, Scotch, or ingrain carpet fabric is woven with two or more planes or plies of weft—that is to say, it has two or more webs or layers of material thrown or shot by the shuttle—the said webs being bound together by the interweaving both of the warp-threads and the weft material; but in our improved carpet fabrics, while we also employ two plies of weft material thrown by the shuttle, one web is composed of only one-half of the number of shots comprised in the other web. The finished fabric is therefore hereinafter called a "one-and-a-half-ply" carpet, like those referred to in the above-named patent, No. 11,692 of 1895. In the the set of three shots forming our fabric two shots are placed side by side in forming one web and one shot in forming the other web. The one shot can change places with either of the two shots or with both. We use a stuffer-warp running between the two webs of weft, as in carpets described in John Orr's British patent, No. 905 of 1855. In this class of carpets the stuffer-warp is used mainly as a controlling or guiding warp to determine the position of the wefts. In our invention it may guide two wefts to the top or upper surface of the fabric and one to the bottom surface, or vice versa. If two wefts are guided to the top and one weft guided to the bottom, and supposing the two top wefts to occupy the space of two-eighths of an inch, then the one bottom weft will only occupy one-eighth of an inch, while the other one-eighth not so occupied is formed by the uncovered stuffer-warp, or if the reverse be woven—that is, if the stuffer-warp guides one weft to the top and two wefts side by side to the bottom surface—then one-eighth of an inch of the stuffer-warp will remain uncovered and exposed as if on the top surface of the fabric. Thus by omitting one weft-thread in every four of the wefts as formerly used the usual "pairing" or "mating" of wefts does not occur in our one-and-a-half-ply carpet fabrics. It follows also that the color of the exposed stuffer-warp, in combination with any one of the three wefts used, produces a color effect. Thus if

the three shuttles thrown respectively contain wefts colored olive, scarlet, and cream and the stuffer-warp is black then the following combinations of colors may be produced: olive and scarlet, olive and black, olive and cream, scarlet and cream, scarlet and black, and cream and black. Consequently any two of the wefts can be brought to the top surface side by side, while any one of the three wefts can also be brought to the surface to combine in color effect with the uncovered black stuffer-warp.

As the stuffer-warp plays the most important part in guiding the wefts to their allotted places in the fabric and in itself forms part of the pattern or design, it is necessary to use a jacquard-machine and stamp-cards in the usual way for lifting or lowering the stuffer-warp threads. In a simple class of design the binder-warp threads may be operated by a pair of gears or heddles, one heddle lifting twice in succession to admit of two wefts, the other heddle lifting once to admit of one weft; but in more elaborate designs, where more color effects are required, it is necessary to use a jacquard-machine and to stamp the cards for lifting the binder-warp threads. For example, if a 1088 needle jacquard be fixed on a loom five hundred and forty-four needles may be used for the stuffer-warp and five hundred and forty-four needles for the binder-warp. It facilitates and simplifies the stamping if two cards can be worked on the cylinder, one to control the stuffer-warp needles and the other the binder-warp needles, the harness of the loom being tied up to suit. The drawing of the slay may be such as to produce a straight rib, such as described in Orr's British patent, No. 905 of 1855, or to produce a twilled effect, as described in Naylor's British patent, No. 14,410 of 1888. In the former case two threads of stuffer-warp may be controlled by one needle, as they always lift together; but in the latter each thread of stuffer-warp must be controlled by a separate needle and eight-by-eight design-paper is used for designs, the usual eight-holes-in-a-row machine being used in stamping, each punch serving for a single thread of stuffer-warp. In the former case, however, four-by-eight design-paper is used. The eight-holes-in-a-row machine may be also employed, the punches being used in pairs; but in case two ends of warp are drawn through one eye in the harness and controlled by one needle then a half-sized stamping-machine and jacquard-machine should be employed. The designs are painted in the ordinary way and while stamping the stamper reads two lines or lashes at once, which we name a "course." A course will show all the varied positions of the three wefts used in the set, a card being stamped for each weft, and therefore for each pick of the loom. The stamper should read and stamp all the olive cords first, for example, then all the scarlet cords, then all the cream, or any other order indicated in the design, but the whole of one color before stamping the next color, and so on; but the color of the stuffer-warp must not be stamped, as it is produced automatically in controlling the three wefts, the same principle being followed for stamping for the binder-warps as for the stuffer-warp.

What we claim is—

An ingrain carpet fabric of four colors, woven in sets of three weft-threads of diverse colors in two planes of weft material with a stuffer-warp B of another color between said planes, the said stuffer-warp being so worked as to guide from time to time one weft-thread to the top surface and two weft-threads to the bottom side by side in each set, or reversely two weft-threads side by side to the top, and one weft-thread to the bottom in each set, in accordance with the pattern or design, the said warp B showing its color effect beside the single weft-thread in the set, substantially as and for the purpose herein described.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

THOMAS FOX NAYLOR.
ARTHUR NAYLOR.

Witnesses:
HARRY COATES,
CHARLES EDWARD TOLSON.