

UNITED STATES PATENT OFFICE.

HARRY HARDWICK, OF PHILADELPHIA, PENNSYLVANIA.

ART OF WEAVING MULTIPLE-PLY FABRICS.

SPECIFICATION forming part of Letters Patent No. 359,862, dated March 22, 1887.

Application filed November 20, 1886. Serial No. 219,503. (Specimens.)

To all whom it may concern:

Be it known that I, HARRY HARDWICK, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in the Art of Weaving Multiple-Ply Fabrics, of which the following is a specification.

My invention consists of a novel method of weaving multiple-ply fabrics—such, for instance, as two-ply ingrain carpet—the object
10 of my invention being to provide a more acceptable distribution of colors in the pattern than is possible when the carpet is woven in the usual manner.

15 In weaving ordinary two-ply ingrain carpet, four sets of warp-threads and four west-threads are usually employed, two of said west-threads forming the figure and the other two forming the ground, each of the figure-threads hav-
20 ing as its mate one of the ground-threads, and these threads being so arranged that when a figure-thread appears upon the face of the fabric its mate thread appears on the back, the figure-thread appearing upon the back
25 when the mate ground-thread appears upon the face. This result is necessitated in the usual manner of weaving two-ply ingrain carpets, owing to the manner in which the warp-threads are operated. There are four
30 sets of warp-threads, two for the ground and two for the figure, and these threads are usually of the same colors as the west-threads, each west-thread where it appears upon the face of the fabric being bound by a warp-
35 thread of its own color. There is in the loom for weaving the fabric a lifter-board for the ground-warps, a lifter-board for the figure-warps, and a harness shaft or frame for each of the four warps, and there is but one oper-
40 ation of the Jacquard needles for every two picks of the loom, there being an operation of the ground and figure lifter-boards in succession between the operations of the Jacquard needles. Each Jacquard needle controls two
45 tails, one connected to a figure-warp of one or more sets, and the other to the mate ground-warp of said set or sets, and the lifter-boards are so constructed that when the figuring-tail of the needle is adjusted so as to be lifted by
50 the figure lifter-board the ground-tail will

not be acted on by the ground lifter-board when it rises. The west-threads are inserted in a certain order, and this order is repeated indefinitely.

In my Patent No. 353,135, dated November 23, 1886, I have given a detailed statement of the operations of the loom necessary in weav-
55 ing a piece of two ply ingrain fabric in the usual manner, and this will make it clear that the ordinary method of working the warp-
60 threads necessitates the disposal of the various threads in the manner which I have before mentioned.

In carrying out my invention I discard the alternate operation of the Jacquard needles,
65 and instead operate them on each pick of the loom, so that by a proper arrangement of the cards, and without interfering with the usual order of insertion of the west-threads, the warps may be so operated as to permit the
70 bringing of any desired west-threads of the set side by side on the same face of the fabric. I employ the same loom as is now employed for weaving the fabric, the only change neces-
75 sary being in the mechanism for operating the Jacquard cylinder and the use of double the number of cards formerly employed.

I do not here claim a fabric produced in accordance with my invention, as this forms the subject of my Patent No. 353,135, before re-
80 ferred to; but

I claim as my invention—

As an improvement in the art of weaving multiple-ply fabrics, the mode herein de-
85 scribed, which consists in controlling mate warp-threads of ground and figure by one needle, introducing the west-threads in a certain order, operating the ground and figure lifter-boards in succession, one for each pick, and operating the needles by the Jacquard cylin-
90 der before each pick, all substantially as specified.

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

HARRY HARDWICK.

Witnesses:

WILLIAM D. CONNER.

HARRY SMITH.