No. 638,410. Patented Dec. 5, 1899.

T. B. DORNAN.

CARPET FABRIC.

(Application filed Dec. 2, 1898.)

(Specimens.)

Fig. 8.

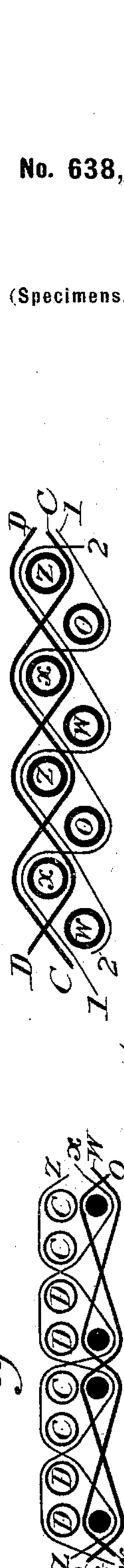

Fig. 1

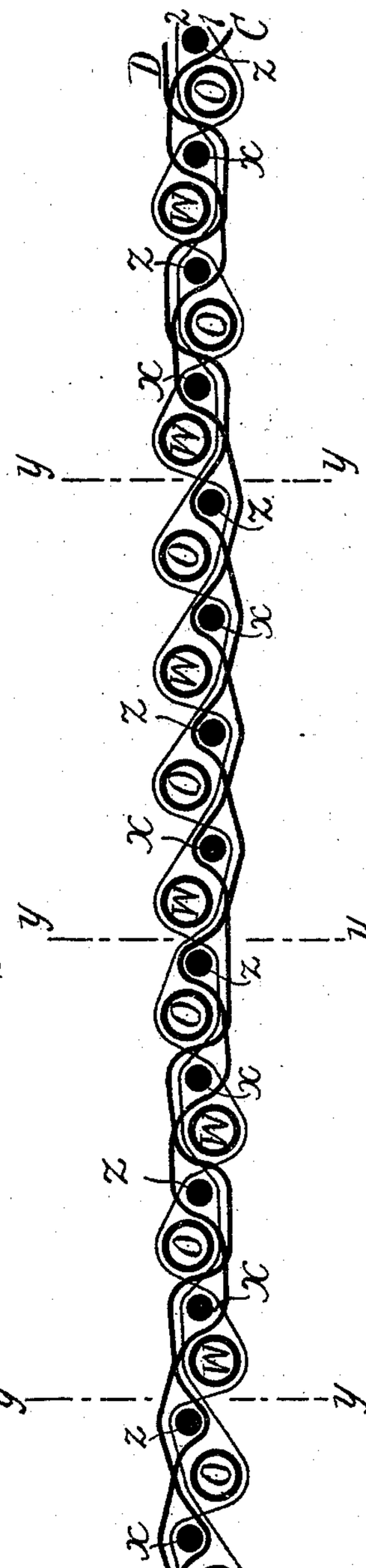

Fig. 3

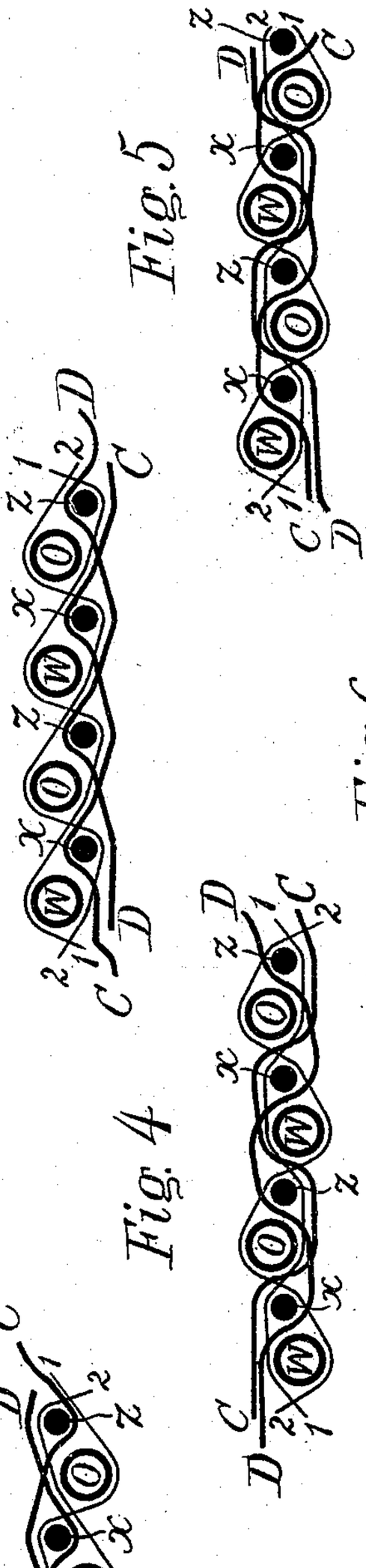

Fig. 5

Fig. 7.

Fig. 6

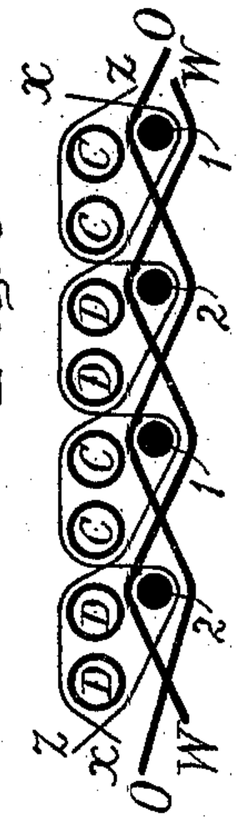

Fig. 4

Fig. 2

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CARPET FABRIC.

SPECIFICATION forming part of Letters Patent No. 638,410, dated December 5, 1899.

Application filed December 2, 1898. Serial No. 698,037. (Specimens.)

To all whom it may concern:

Be it known that I, THOMAS BENTON DORNAN, a citizen of the United States, and a resident of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Carpet Fabrics, of which the following is a specification, reference being had to the accompanying drawings, forming part hereof.

This invention relates to fabrics for carpets, &c., and has for its objects lessening of the cost of the fabric and also improvements in the direction of tight weaving and homogeneity, with consequent increase of strength and durability, and also improved general appearance in the purity of color effects and embossed appearance.

Other objects will appear from the following full description of the carpet fabric embodying my invention shown in the accompanying drawings.

Figure 1 is a diagrammatic longitudinal section of a carpet fabric embodying my invention with several effects shown successively thereon, the changes of effect being indicated by broken vertical lines *y y*. Fig. 2 is a similar view of the first effect thereof, ground up. Fig. 3 is a similar view of the third effect thereof, figure up. Fig. 4 is a similar view of the second effect thereof, one of the shot-abouts. Fig. 5 is a similar view of the fourth effect thereof, the other shot-about. Fig. 6 is a diagrammatic transverse section of the first effect, ground up. Fig. 7 is a similar view of a modified structure with the binder-warps grouped together in pairs and the figuring-warps grouped together in pairs. Fig. 8 is a diagrammatic longitudinal section of the effect, ground up, in a slightly-modified structure having binder-wefts of the same size as the figuring-wefts.

My improved fabric is composed of figuring weft-threads and binder weft-threads and figuring warp-threads and binder warp-threads. The ground effect is produced by figuring warp-threads bound by the binder weft-threads. The figure effect is produced by figuring weft-threads bound by binder warp-threads and corresponds in appearance with the usual figure effect of a two-ply ingrain carpet fabric, except that the figuring weft-threads are raised by the tension of the figuring-warps, so as to present a pleasing and acceptable embossed appearance. The shot-about effects combine the figuring-warps and one or the other of the figuring-wefts.

The weft-threads are arranged in sets of four weft-threads each—two figuring weft-threads W and O and two binder weft-threads *x* and *z*. The warp-threads are arranged in sets of four warp-threads each—two figuring warp-threads and two binder warp-threads; but each figuring warp-thread is a double thread of two threads passing through the same mail and controlled as one thread, as shown in Figs. 6 and 7.

C C and D D are the double figuring warp-threads, and 1 and 2 are the binder warp-threads. The figuring warp-threads may be triple or quadruple, with three or four threads in a mail as desired, a sufficient number of threads being employed to effectually cover and conceal the figuring weft-threads.

For the purposes of illustration assume that the figuring weft-thread W is of white color, the figuring weft-thread O is of orange color, the binder weft-threads *x* and *z* green, the figuring-warps C and D green, the binder-warp 1 white, and the binder-warp 2 orange.

I will now describe the construction of and the preferred manner of weaving the fabric shown.

To produce the effect ground up—ground on the face and figure on the back of the fabric (shown separately in Fig. 2 and as the first effect in Fig. 1)—for the first shot, figuring weft-thread W, the binder-warp 1 is raised by the journal or heddle and the figuring warp-threads C and D are raised by the jacquard. The figuring weft-thread W is then thrown. For the second shot, the binder-warp *x*, the journal still holds up the binder-warp 1 and the jacquard raises the figuring warp-threads C. The binder-weft *x* is then thrown. For the third shot, figuring weft-thread O, the journal raises the binder-warp 2 and the jacquard raises the figuring warp-threads C and D. The figuring weft-thread O is then thrown. For the fourth shot, binder weft-thread *z*, the journal still holds up the binder-warp 2 and the jacquard raises the figuring warp-threads D. The binder weft-thread *z* is then thrown. This completes the unit of weaving, which may be repeated as many

times as desired and at any part of the fabric, in accordance with the requirements of the pattern. Two of these units or sets are shown in Figs. 1 and 2 following each other in longitudinal line, and two of these units are shown in Fig. 6 arranged side by side. In this effect the figuring warp-threads C and D are always above the figuring weft-threads W and O, and these figuring warp-threads force the figuring weft-threads downward, producing an embossed effect upon the back of the fabric. The binder weft-threads *x* and *z* are pulled by the figuring warp-threads to the face or upper surface, so that they are, in fact, not visible at the back or lower surface, and a pure effect of the wefts W and O and the warps 1 and 2 is there obtained, and with the colors above assumed this would be the effect white and orange, the white figuring-weft being bound by an orange binder-warp and the orange figuring-weft by a white binder-warp. The figuring-warps not only cover and conceal the figuring weft-threads, but also cover and conceal the binder warp-threads, and thus a pure effect of the figuring-warps and binder-wefts is obtained on the face or upper surface of the fabric, and with the colors above assumed this would be a solid green effect, composed of green figuring-warps bound by green binder-wefts.

To produce the effect figure up—figure on the face and ground on the back of the fabric, (shown separately in Fig. 3 and as the third effect in Fig. 1)—for the first shot, figuring weft-thread W, the binder warp-thread 1 is raised by the journal and the jacquard does not lift either of the figuring warp-threads. The figuring weft-thread W is then thrown. For the second shot, binder weft-thread *x*, the binder warp-thread 1 is still held up by the journal and the jacquard raises the figuring warp-threads C. The binder weft-thread *x* is then thrown. For the third shot, figuring weft-thread O, the journal raises the binder warp-thread 2 and the jacquard does not lift any of the figuring warp-threads. The figuring weft-thread O is then thrown. For the fourth shot, binder weft-thread *z*, the journal still holds up the binder warp-thread 2 and the jacquard raises the figuring warp-threads D. The binder weft-thread *z* is then thrown. This completes the unit of weaving. In this effect the figuring warp-threads C and D are always underneath the figuring weft-threads W and O, and these figuring warp-threads force the figuring weft-threads upward, producing an embossed effect upon the face of the fabric. The binder weft-threads *x* and *z* are pulled by the figuring warp-threads to the back of the fabric and are invisible at the face, and a pure effect of the wefts W and O and the warps 1 and 2 is obtained, which with the colors above assumed would be composed of lines of white figuring-wefts bound by white binder-warps alternating with lines of orange figuring-wefts bound by orange binder-warps. The figuring-warps not only cover and conceal the figuring weft-threads, but also cover and conceal the binder warp-threads, and thus a pure effect of the figuring-warps bound by the binder-wefts is obtained on the lower face or back of the fabric, and with the colors above assumed this effect would be a solid green effect, composed of green figuring-warps bound by green binder-wefts.

To produce the shot-about effect shown separately in Fig. 4 and as the second effect in Fig. 1, for the first shot, figuring weft-thread W, the journal raises the binder warp-thread 1 and the jacquard raises the figuring warp-thread C and D. The figuring weft-thread W is then thrown. For the second shot, binder weft-thread *x*, the journal still holds up the binder warp-thread 1 and the jacquard raises the figuring warp-threads C. The binder weft-thread *x* is then thrown. For the third shot, the figuring weft-thread O, the journal raises the binder warp-thread 2 and the jacquard does not raise any of the figuring warp-threads C or D. The figuring weft-thread O is then thrown. For the fourth shot, binder weft-thread *z*, the journal still holds up the binder warp-thread 2 and the jacquard raises the figuring warp-threads D. The binder weft-thread *z* is then thrown. This completes the unit of weaving. In this effect the figuring warp-threads are always over the figuring weft-thread W and cause this weft-thread to stand out from the lower surface, and the figuring warp-threads are always underneath the figuring weft-thread O and cause it to stand out from the upper surface. The effect upon the upper surface is of a transverse line of the figuring-warps C and D, bound by the binder weft-threads *x* and *z*, alternating with a line of the figuring weft-thread O, bound by the binder warp-thread 2, and with an embossed effect, and with the colors above assumed this would be a green-and-orange effect of green figuring-warps bound by green binder-wefts and of orange figuring-wefts bound by orange binder-warps, and the effect upon the lower surface is of a transverse line of the figuring weft-thread W, also bound by the binder-warp 2 and with an embossed effect alternating with a transverse line of the figuring-warps C and D, bound by the binder-wefts *x* and *z*, and with the colors above assumed this would be a white-and-green effect of white figuring-wefts bound by orange binder-warps and green figuring-warps bound by green binder-wefts. These effects are clear, as the figuring-warps when upon either surface substantially conceal the binder-warps, and the binder-wefts do not appear on either surface except where they bind the figuring-warps.

To produce the shot-about effect shown separately in Fig. 5 and as the fourth effect in Fig. 1, for the first shot, figuring-weft W, the journal raises the binder warp-thread 1 and the jacquard does not raise either of the figuring warp-threads C or D. The figuring

weft-thread W is then thrown. For the second shot, binder weft-thread *x*, the journal still holds up the binder warp-thread 1 and the jacquard raises the figuring warp-threads C. The binder weft-thread *x* is then thrown. For the third shot, figuring weft-thread O, the journal raises the binder warp-thread 2 and the jacquard raises the figuring warp-threads C and D. The figuring weft-thread O is then thrown. For the fourth shot, binder weft-thread *z*, the journal still holds up the binder warp-thread 2 and the jacquard raises the figuring warp-threads D. The binder weft-thread *z* is then thrown. This completes the unit of weaving. In this effect the figuring warp-threads are always under the figuring weft-thread W and always over the figuring weft-thread O. The effect upon the upper surface is of a transverse line of the figuring weft-thread W, bound by the binder warp-thread 1, with an embossed appearance, alternating with a transverse line of the figuring-warps C and D, bound by the binder weft-threads *x* and *z*, and with the colors assumed this effect would be white and green, of white figuring-wefts bound by white binder-warps and of green figuring-warps bound by green binder-wefts, and the effect upon the lower surface or back of the fabric is of a transverse line of the figuring-warps C and D, bound by the binder weft-threads *x* and *z*, alternating with a transverse line of the figuring weft-thread O, bound by the binder warp-thread 1 and with an embossed appearance, and with the colors assumed this effect would be green and orange, of green figuring-warps bound by green binder-wefts and orange figuring-wefts bound by white binder-warps.

It will be seen that these color effects correspond with those of a two-ply ingrain carpet fabric having a solid-colored ground, and my improved single-ply fabric has substantially the same appearance as such a two-ply ingrain carpet fabric, but is more tightly woven and more durable than such a fabric and is much cheaper than such a fabric. Further, its appearance is more acceptable than that of a two-ply ingrain fabric by reason of the embossed appearance of the figure effect and of the weft-lines of the shot-about effect.

It will be observed that throughout the weaving of the fabric the figuring warp-threads C are always raised when the binder weft-thread *x* is thrown, and the figuring warp-threads D are always raised when the binder weft-thread *z* is thrown, and therefore journals could be employed for controlling these warp-threads to form the sheds for the binder weft-threads; but I prefer to use journals only for controlling the binder warp-threads and to control the figuring warp-threads exclusively by the jacquard. The binder-warps could also be controlled by the jacquard-machine; but I prefer to operate them by journals or heddles.

The binder warp-threads 1 and 2 may be grouped side by side and arranged alternately with groups of the figuring warp-threads C and D, also side by side, as shown in Fig. 7, if desired, with the result of placing the tyings of the weft-threads in line with each other instead of alternately, as in the construction shown in Figs. 1 to 6, inclusive; but I prefer the latter arrangement, with single binder-warps alternating with the figuring-warps throughout the fabric, which is the usual in-grain arrangement.

In the above illustration of colors I have described the binder warp-threads as of the same colors as the figuring-wefts bound by them in the upper ply. I have found, however, that the purity of the shot-about effects will be improved and an absolutely solid color of ground will be obtained by employing binder warp-threads of a color resembling that of the figuring-warps, as in the example given, by employing binder warp-threads of or resembling a green color. As these warp-threads are usually quite fine, a highly-acceptable figure effect may be attained. Preferably the binder-wefts are smaller than the figuring-wefts; but in some instances they may be as large as the figuring-wefts, as shown in Fig. 8.

It will be observed that throughout the structure of the fabric a binder weft-thread and a figuring weft-thread are included in each loop of the binder warp-threads and also that a binder-warp and the plurality of threads constituting a figuring-warp are included in each loop of the binder weft-threads. This inclusion of a binder and figuring thread in each loop contributes to the facility with which the figuring-thread of a loop is drawn to one surface of the fabric while the binder-thread of the same loop is drawn to the other surface of the fabric, and thus permits in a single-ply fabric the attainment of pure effects on both surfaces of the fabric.

It will be observed that the ground effect upon the face of the fabric is always accompanied by the figure effect upon the back, and therefore when the ground effect is employed as the background or body or ground of a pattern on the face the figure effect will be the background or body or ground of the reverse pattern on the back. As both of these effects—ground and figure—are clear and pure and the shot-abouts are equally clear on both face and back, the back of the carpet is always of acceptable appearance, and the carpet is therefore a satisfactory reversible fabric. In the many varieties of patterns and colorings which may be employed in fabrics embodying my invention the effect which I have termed the "figure" effect may be used as the ground of a pattern on the face of the fabric, in which event the effect which I have termed the "ground" effect would be the ground of the pattern on the back. The ground may be formed of a solid color or of two colors

either of figuring-warps or figuring-wefts, and the figure may be formed of a solid color or of two colors either of figuring-warps or figuring-wefts.

It is evident that various modifications may be made in the construction above described without departing from my invention.

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

1. A single-ply reversible fabric composed of figuring weft-threads and binder weft-threads and figuring warp-threads and binder warp-threads, the figuring weft-threads being bound by binder warp-threads and the figuring warp-threads being bound by binder weft-threads, with a figuring weft-thread and a binder weft-thread in each loop of binder warp-threads and a figuring warp-thread and a binder warp-thread in each loop of binder weft-threads, and the figuring weft-threads projecting beyond the figuring warp-threads with an embossed effect, substantially as set forth.

2. A single-ply reversible fabric composed of figuring weft-threads and binder weft-threads and figuring warp-threads and binder warp-threads, each figuring warp-thread being composed of a plurality of threads, with a figuring weft-thread and a binder weft-thread in each loop of binder warp-threads and a plural figuring warp-thread and a binder warp-thread in each loop of binder weft-threads and the figuring weft-threads projecting beyond the figuring warp-threads with an embossed effect, substantially as set forth.

Signed at Philadelphia, county of Philadelphia, State of Pennsylvania, this 30th day of November, 1898.

THOMAS BENTON DORNAN.

Witnesses:

OSCAR RIGHTER,

GEORGE W. GOLDEN.