

(Specimens.)

3 Sheets—Sheet 1.

H. HARDWICK.
INGRAIN CARPET FABRIC.

No. 505,789.

Patented Sept. 26, 1893.

Key Chart for Warps.

White Black Orange Red

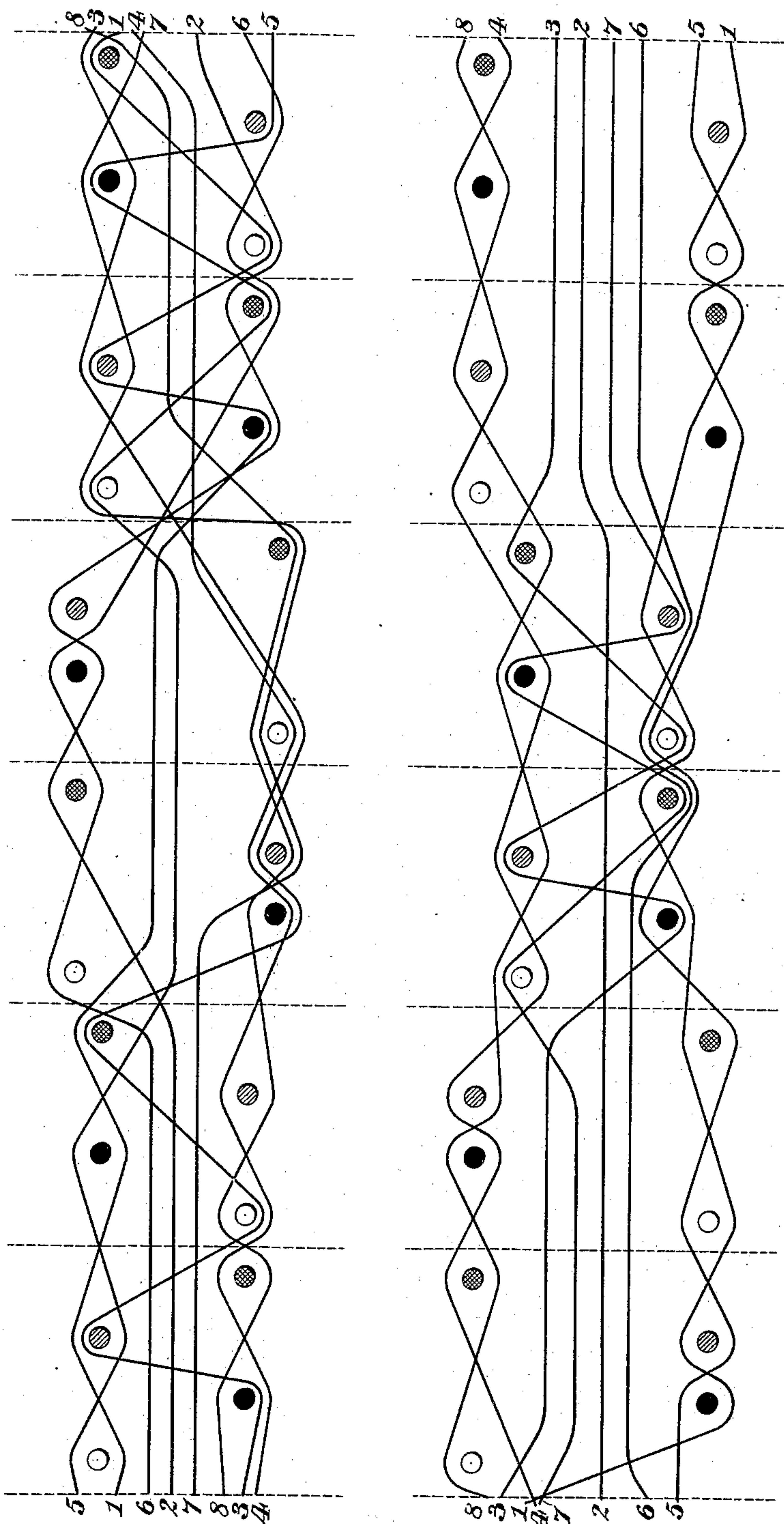


Fig. 1.

Witnesses

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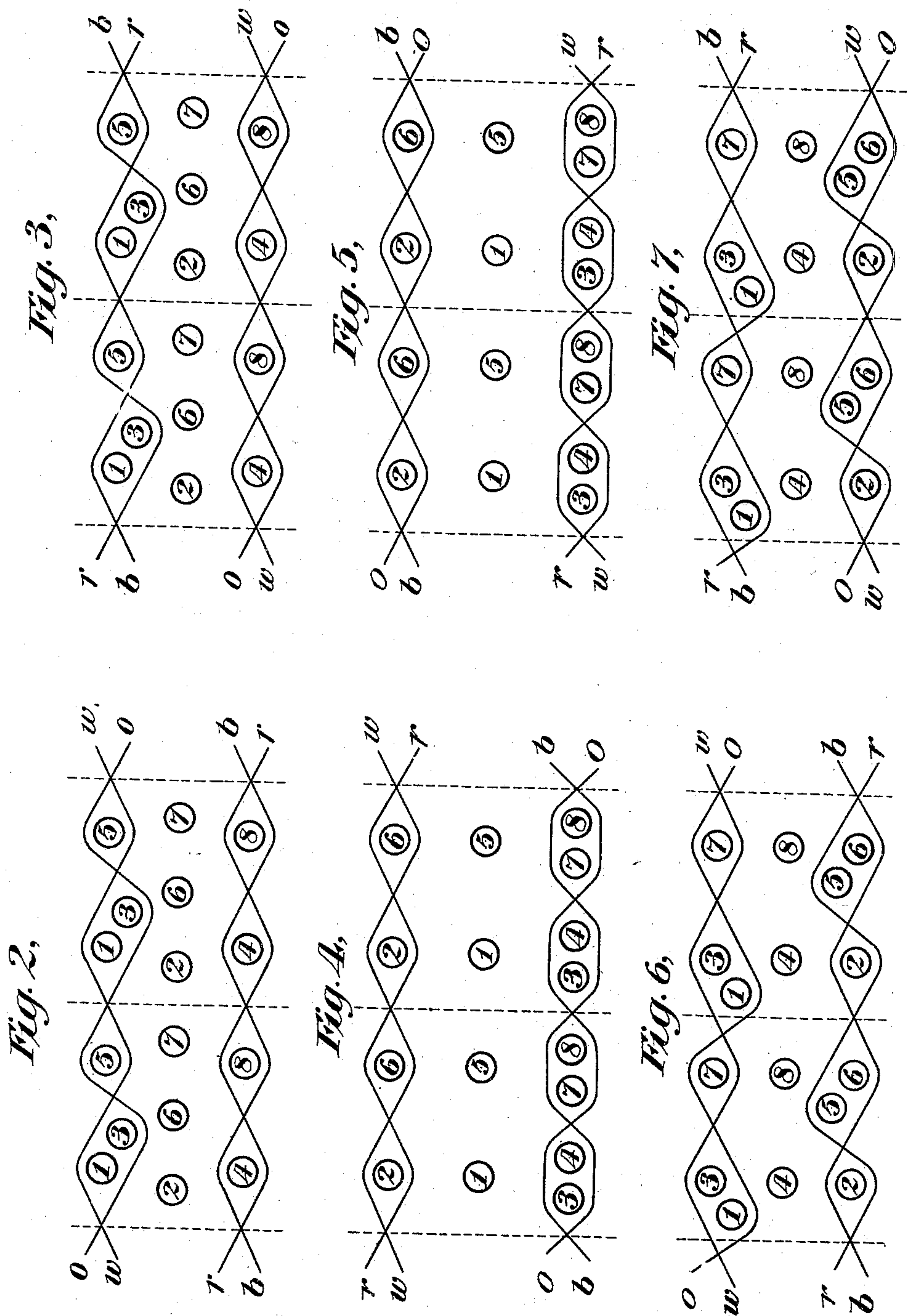
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Fig. 9.

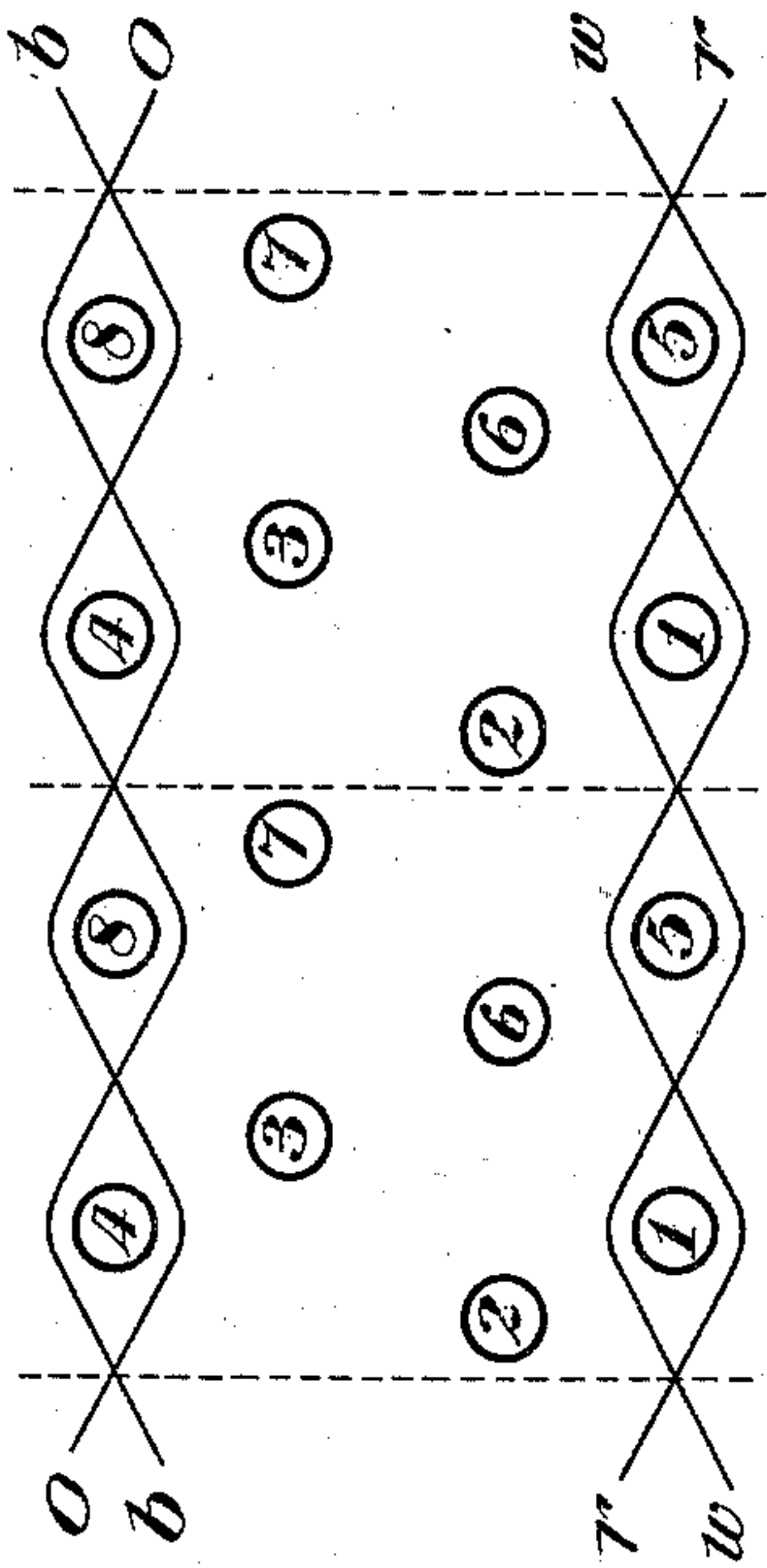


Fig. 11.

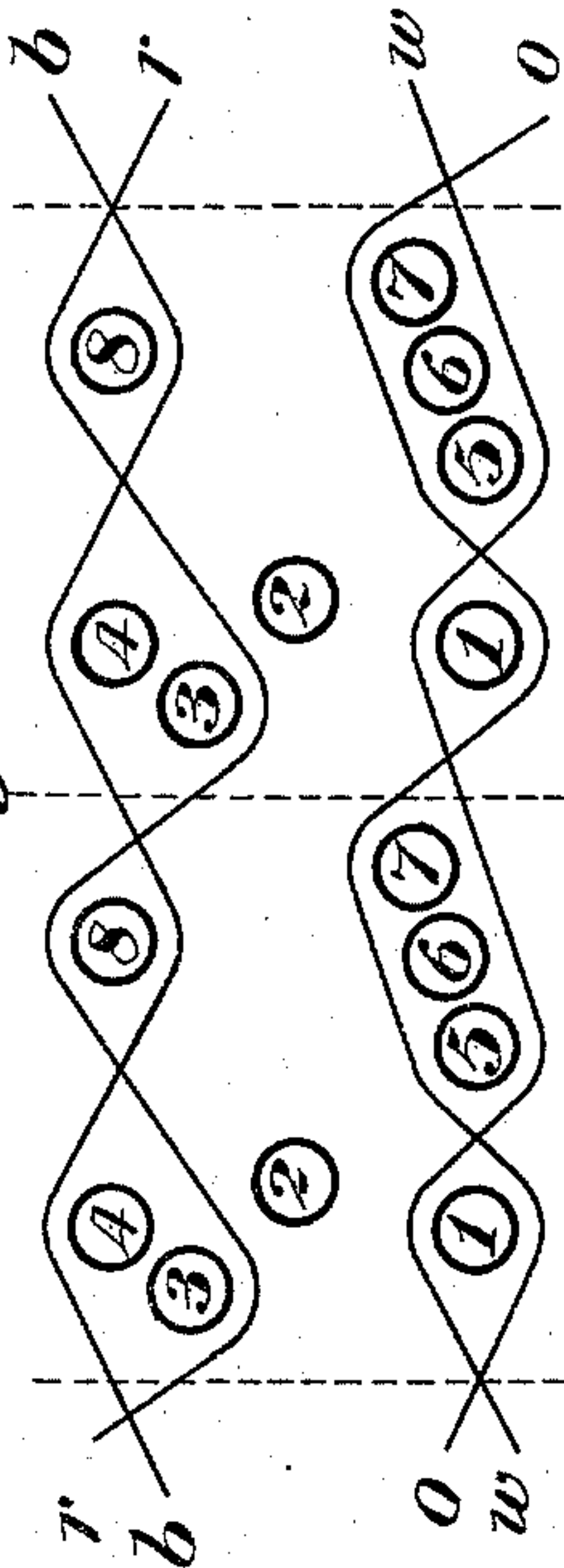


Fig. 13.

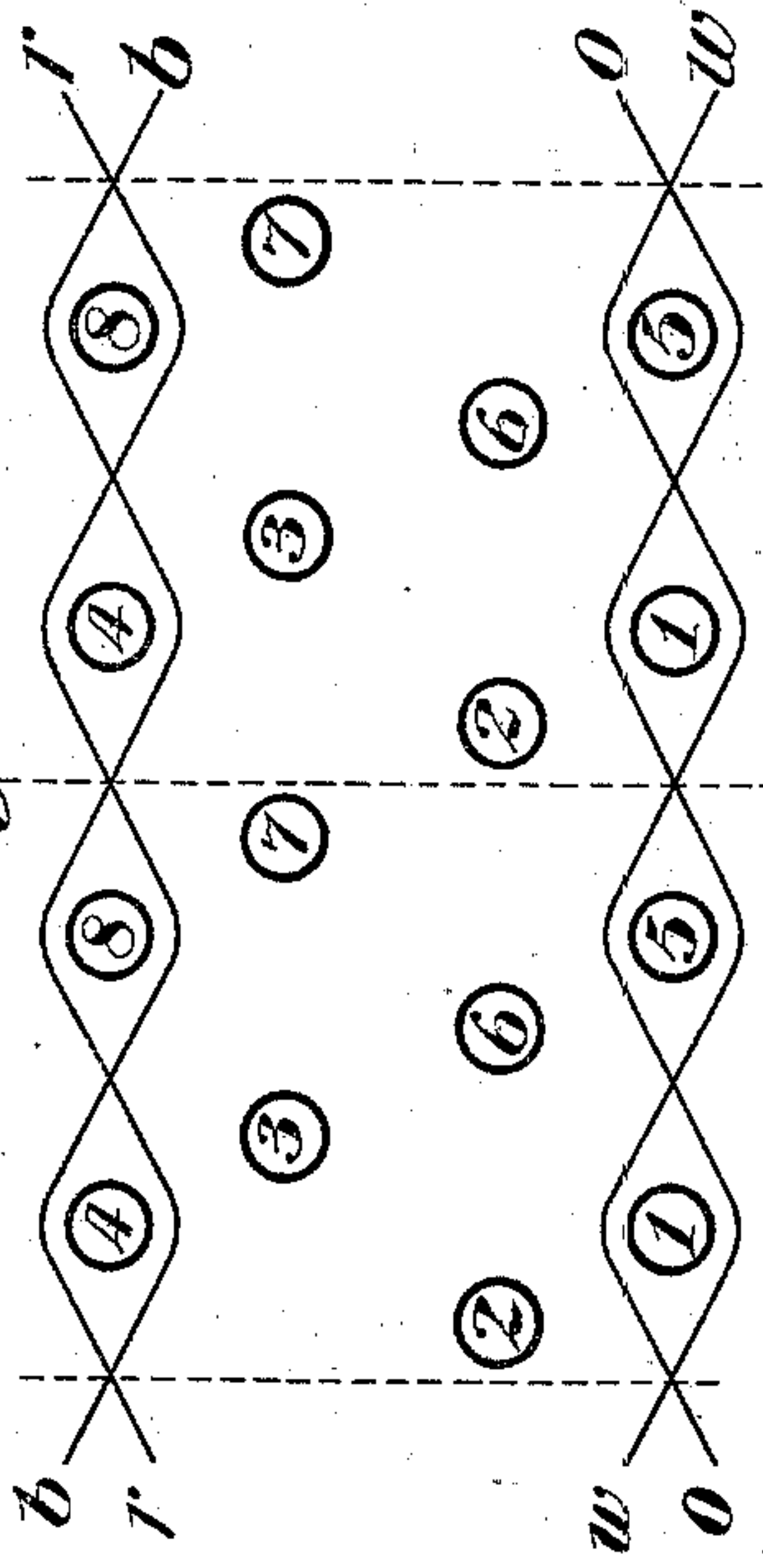


Fig. 8.

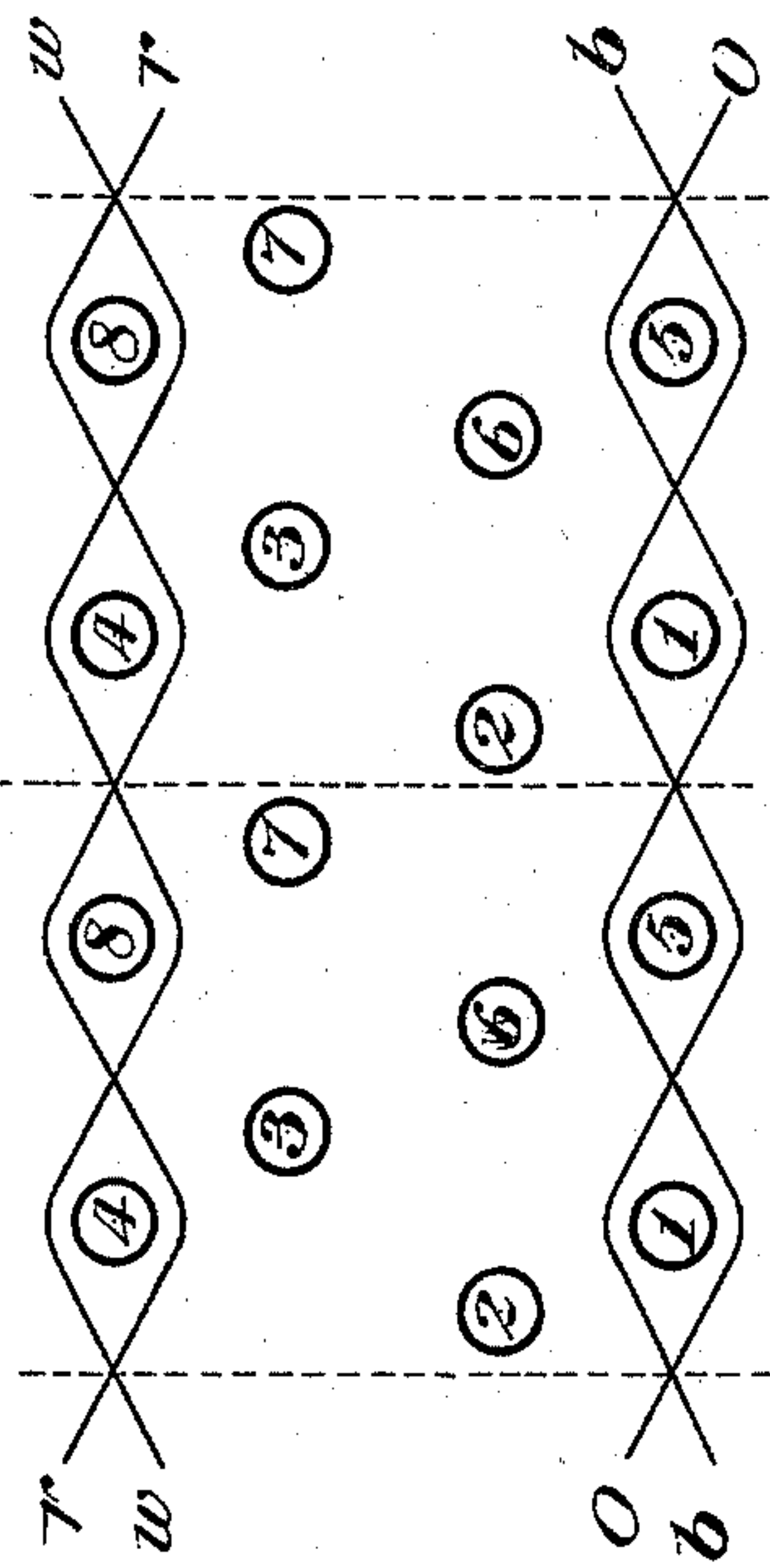


Fig. 10.

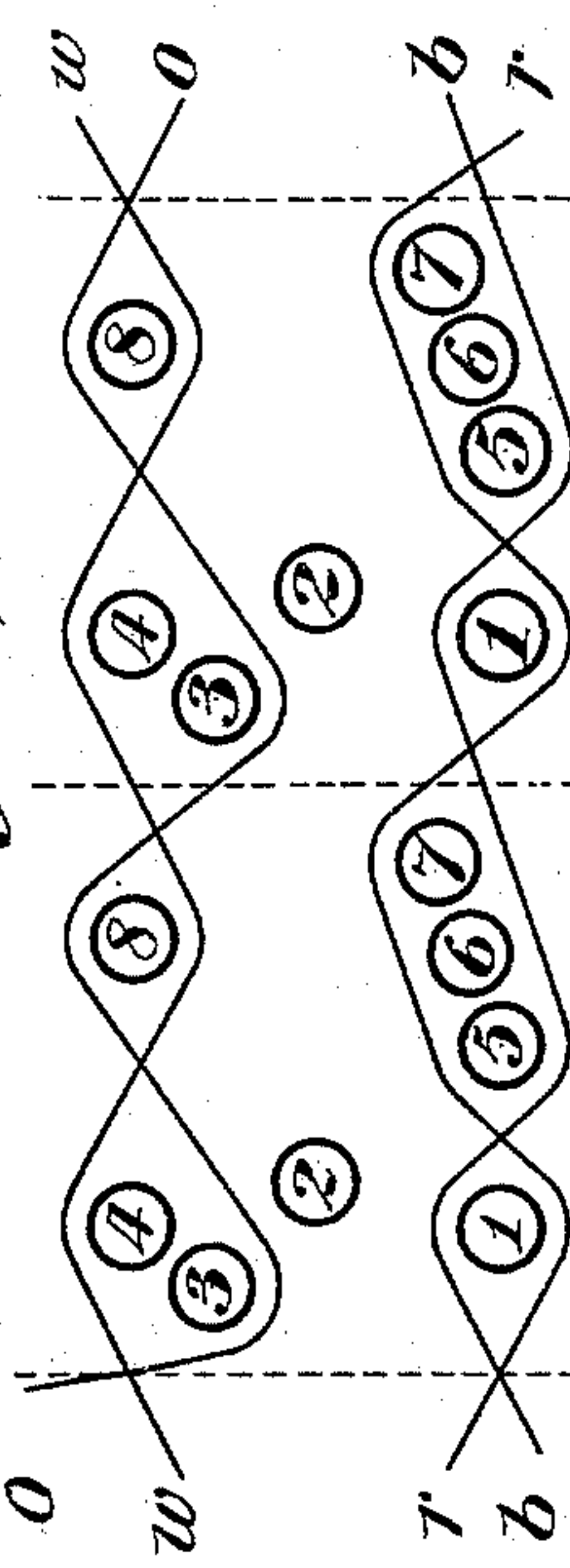
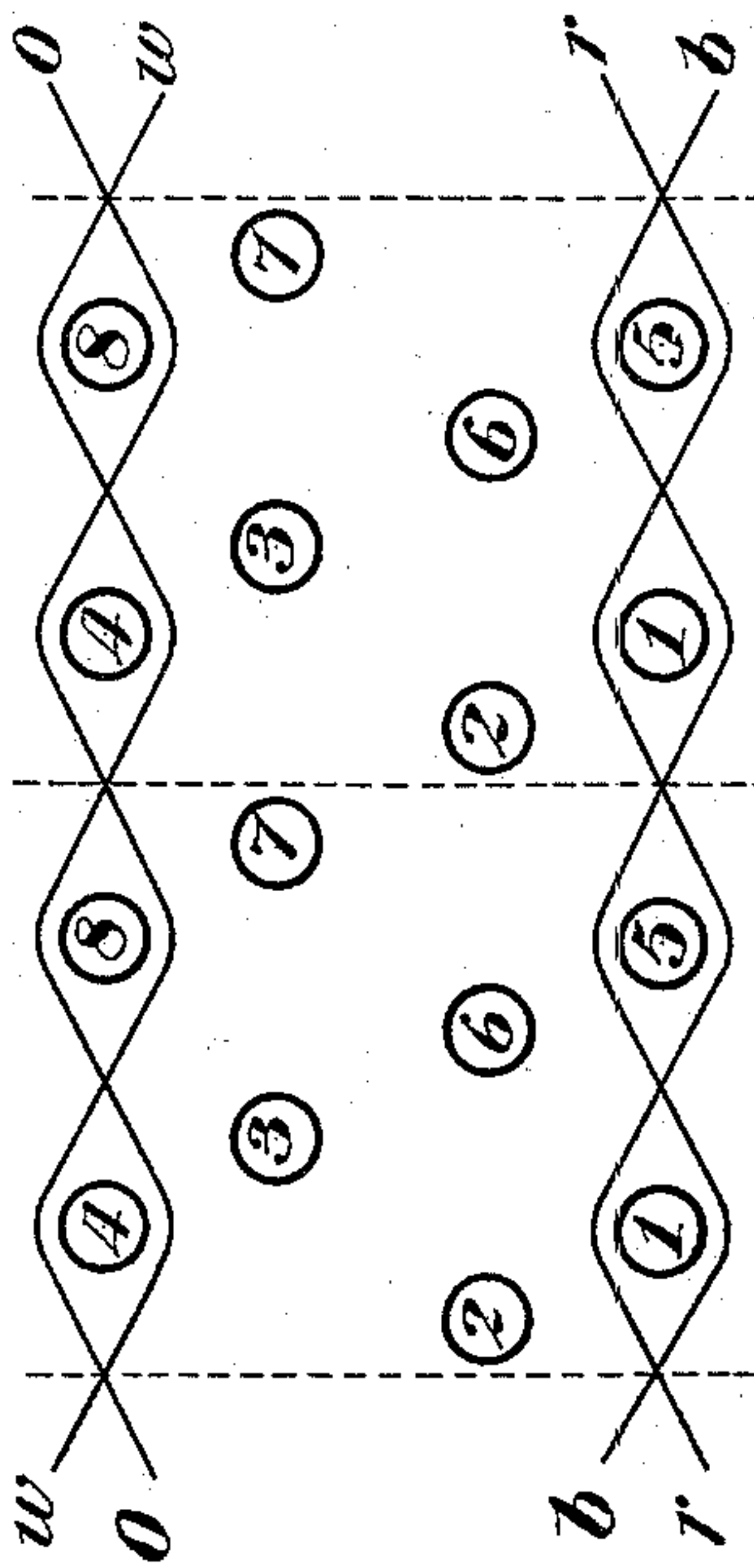


Fig. 12.



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UNITED STATES PATENT OFFICE.

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INGRAIN CARPET FABRIC.

SPECIFICATION forming part of Letters Patent No. 505,789, dated September 26, 1893.

Application filed May 21, 1891. Serial No. 393,556. (Specimens.)

To all whom it may concern:

Be it known that I, HARRY HARDWICK, a citizen of the United States, residing at Thompsonville, in the county of Hartford and State of Connecticut, have invented a certain new and useful Improvement in Ingrain Carpet Fabrics, which improvement is fully set forth in the following specification and accompanying drawings, which form a part hereof.

The invention relates to ingrain carpet fabrics and it has for its object to increase the range of design and color effects attainable on the face and back of such a carpet and at the same time to retain much of the economy and the close woven structure of two-ply ingrain carpet associated with the greater thickness of three-ply ingrain carpets and a solid homogeneous structure in parts associated with embossing effects or raised effects in the pattern.

The fabric embodying my invention has two faces formed of interwoven warp threads and weft threads, and all the said warp threads throughout one set or unit of the structure are confined to one or the other of said faces. The said faces are tied together, or solid-weave, in some of the sets or units of the structure, and are not tied together, or bag-weave, in other sets or units of the structure, while throughout the fabric weft threads intervene between the faces, in the solid-weave portions some or all of the said intervening weft threads passing from face to face in each set and thus tying the two faces together, while in the bag-weave portions said intervening weft threads float between the faces.

The accompanying drawings illustrate diagrammatically the interweaving of the threads in a piece of fabric embodying my invention in one of the best forms of embodiment known to me.

Figure 1 shows a cross section or section cut across parallel to the weft threads of the fabric. Figs. 2 to 13, inclusive, show longitudinal sections or sections cut longitudinally parallel to the warp threads of the different effects represented in Fig. 1, each figure showing two sets of weft threads. Fig. 2 shows the first effect of Fig. 1, Fig. 3 the second, Fig. 4

the third and so on in regular order, Fig. 13 showing the twelfth effect of Fig. 1.

In my improved fabric I employ figuring warp threads and figuring weft threads.

My broad invention contemplates the employment of figuring weft threads in sets of six or more in a set, departing from the two-ply ingrain fabric in that respect; and contemplates the employment of warp threads less in number in a set than the weft threads. When my entire invention is embodied I employ the weft threads in sets of eight in a set, and the warp threads in sets of four in a set.

Referring to the particular fabric illustrated in the drawings the weft threads are represented in Fig. 1 each by a single line in the drawings and are numbered in the order of their introduction in the weaving 1, 2, 3, 4, 5, 6, 7, and 8. In this figure the warp threads are represented in section by the circles and their colors by the character of circle according to the key-chart for warps.

In Figs. 2 to 13 inclusive, the weft threads are represented in section by circles numbered to correspond with Fig. 1, and the warp threads are represented by lines lettered *w*, *b*, *o* and *r*, respectively, to indicate the warp threads represented in Fig. 1 as having the colors white, black, orange and red, respectively. It is of course to be understood that any suitable colors may be employed, and that those represented in the drawings are simply for purposes of illustration. The drawings are merely intended to indicate the method of interweaving and not the relative sizes of the warp and weft threads nor their exact relative positions in the finished fabric after the beating up. In practice, of course, the wefts are ordinarily heavier than the warps. This is to some extent indicated by the relative dimensions of the circles representing the sections of weft threads in Figs. 2 to 13, inclusive and those representing the warp threads in Fig. 1.

The dotted vertical lines in all the figures separate the complete sets of threads from each other. In Fig. 1 each arrangement of these complete sets is duplicated once in order to show it more clearly, with a slight change in the warping in each case, and there-

fore a slight change in the color tone. This will be plainly evident on comparison of Figs. 2 and 3, of Figs. 4 and 5, and so on. It will be noted that in Figs. 2 and 3, the arrangement of weft threads is the same, while the positions of the warp threads are changed, *w* and *o* being in the upper ply in Fig. 2 and in the lower ply in Fig. 3, *r* and *b* being in the lower ply in Fig. 2 and in the upper ply in Fig. 3. These resemblances and differences will be observed throughout the remaining pairs of figures. It is to be noted also that the arrangement of weft threads is the same in Figs. 8 and 9 as in Figs. 12 and 13, the weft threads 1 and 5 being in the lower face or ply, and the weft threads 4 and 8 being in the upper face or ply in all four figures. The differences lie in the arrangements of warp threads. For instance the warp thread *w* in Fig. 8 shows upon the upper face of the fabric covering the weft thread 4, while in Fig. 12 it is also upon the upper face but covering the weft thread 8; in Fig. 9 upon the lower face and covering the weft thread 5, and in Fig. 13 also upon the lower face but covering the weft thread 1. Again, the warp thread *r* is in the upper face or ply in Figs. 8 and 13, while it is in the lower face or ply in Figs. 9 and 12. It is to be observed also that in the arrangement shown in Figs. 10 and 11, very nearly the same color effect is shown upon the upper face of the fabric as in Figs. 8 and 9, 12 and 13, (the same wefts being exposed covered however by different warps) although the fabric is shown as bag-weave in Figs. 8 and 9, 12 and 13, and solid weave in Figs. 10 and 11. It is understood of course, that each arrangement may be continued as long in the weaving as is required.

The drawings show six different arrangements that may be used in the pattern. Three of these arrangements form a solid or homogeneous weave, and are represented in Fig. 1 as the first, third and fifth, beginning at the left, and are separately represented in Figs. 2 and 3, 6 and 7, and 10 and 11. The other three form an open or bag-weave, and are represented in Fig. 1 as the second, fourth and sixth, beginning at the left, and are separately represented in Figs. 4 and 5, 8 and 9, and 12 and 13.

It will be noted that throughout the different sets represented in the drawings there is always at least one weft thread floating in the center of the fabric between the plies. In the set represented in Figs. 2 and 3, there are three of these wefts numbered 2, 6 and 7, respectively, between the plies, in Figs. 4, 5, 6 and 7, there are two wefts of a set between the plies, in Figs. 10 and 11 there is but one weft of a set between the plies, while in Figs. 8, 9, 12 and 13, there are four wefts of a set between the plies. It will also be noted that at least two of the weft threads are interwoven with warp threads to form each face of the fabric. Thus in the arrangement shown in Figs. 2 and 3 there are two weft

threads (1 and 5) interwoven in the upper ply, two other weft threads (4 and 8) interwoven in the lower ply, and one weft thread (3, see also Fig. 1) interwoven in both plies, and passing from one ply to the other, thus binding the two faces or plies together. In the arrangement shown in Figs. 4 and 5, there are two wefts (2 and 6) interwoven in the upper ply, and four wefts (3, 4, 7 and 8) interwoven in the lower ply. In Fig. 6 there are two wefts (3 and 7) interwoven in the upper ply, two wefts (2 and 6) interwoven in the lower ply, and two wefts (1 and 5, see also Fig. 1) interwoven in both plies and serving to bind the two faces or plies together. In the arrangement shown in Figs. 8 and 9, there are two wefts (4 and 8) interwoven in the upper ply, and two wefts (1 and 5) interwoven in the lower ply. This is also true of the arrangement shown in Figs. 12 and 13. In the arrangement shown in Figs. 10 and 11 there are two wefts (4 and 8) interwoven in the upper ply, three wefts (1, 5 and 6) interwoven in the lower ply, and two wefts (3 and 7) interwoven in both plies and serving to bind the two plies or faces together.

In the first arrangement shown in Fig. 1, (also separately shown in Figs. 2 and 3) the face is formed of wefts 1 and 5 spotted with weft 3, and of warps *w* and *o* in one part, and warps *b* and *r* in the other part. The back is formed of wefts 4 and 8 spotted with weft 3, and of warps *b* and *r* in one part, and warps *w* and *o* in the other part. Wefts 2, 6 and 7 float in the center of the fabric between the two faces, and are not there interwoven with the warp threads but lie loose. Weft 3 however binds the fabric as a whole down into a solid and homogeneous fabric. In the second arrangement (separately shown in Figs. 4 and 5) the face is formed of wefts 6 and 2, and of warps *w* and *r* in one part, and warps *b* and *o* in the other part. The back is formed of wefts 3 and 4 and 7 and 8, and of warps *b* and *o* in one part and warps *w* and *r* in the other part. Wefts 1 and 5 float in the center between the two faces, and are not there interwoven with the warp threads but lie loose. Similarly, the third arrangement (separately shown in Figs. 6 and 7) has the weft threads 7 and 3 with 5 and 1 on the face, and 2 and 6 with 5 and 1 on the back, and warp threads as indicated in the drawings. The weft threads 5 and 1 bind the fabric at this place into a solid and homogeneous fabric. So in the fifth arrangement (Figs. 10 and 11) the fabric is solid and homogeneous, being bound together by the weft threads 3 and 7. In the fourth (Figs. 8 and 9) and sixth (Figs. 12 and 13) arrangements shown, four of the eight wefts float in the center. At these places in the fabric, by reason of the open or bag-weave and the presence of the floating wefts in the center, the pattern will present an embossed or raised appearance standing out from the surrounding parts. This is an important feature of my invention and will be found to

greatly add to the beauty and variety of the patterns that can be produced. In the second arrangement (Figs. 4 and 5) where only two of the eight wefts float in the center, the embossing or raised effect is not quite so marked but is still present.

It is my purpose in practically applying the invention to goods woven for the market to weave the great bulk of the goods into the solid and homogeneous fabric illustrated in the first, third and fifth arrangements shown in the drawings, and to weave only small portions into the open or bag-weave fabric illustrated in the second, fourth and sixth arrangements shown in the drawings, reserving the latter for smaller and special or more important parts of the pattern that are to be given prominence. This causes the fabric as a whole to be largely a solid fabric mechanically (thereby adding to its wearing qualities) and to be largely a ground or setting for the embossed or raised parts æsthetically (thereby adding to its beauty).

In the diagrams successive sets of thread are separated by dotted lines, but it should be understood that the arrangement of threads in any set may be repeated in the pattern as often as desired; and my improved weave may be used in a portion or portions only of fabric, if desired.

Many other arrangements may be employed in the pattern by the skilled designer and weaver, not necessary to be here specifically shown, each presenting on the face a different color effect, and each forming either a solid or homogeneous fabric tied together by weft threads of each set in the homogeneous portions, or an open or bag-weave fabric with one or more weft threads floating in the fabric between the faces.

My present invention is not limited to the particular warping or method of interweaving the warp threads shown in the drawings, nor to the particular arrangement of the weft threads there shown, as these may be greatly varied without departing from my invention.

It has not been deemed necessary in this specification to give a detailed description of the successive changes in the operation of the loom involved in the production of a fabric such as that described herein. The mechanism must be such as to operate the warp threads in the way desired to produce the fabric described, and suitable forms of such mechanism may readily be devised on an understanding of the fabric itself.

The advantages of this fabric can be well explained upon consideration of a single set or any number of repetitions of the same set, first, in the solid weave portions, then in the bag weave portions. In the solid weave portions both surfaces are closely woven, are in fact as closely woven as in the bag weave portions of two-ply carpet, being composed of warp threads distributed through the two faces or face plies of the carpet and each confined to one ply, and also of some of the

weft threads similarly confined to one ply, these warps and wefts being interwoven in their respective plies and forming in fact single cloths, and these faces or plies are tied together by some of the remaining weft threads into a homogeneous fabric. This tying together of the fabric by weft threads does not therefore interfere with the closely woven character of the faces of the fabric. There are in this homogeneous portion weft threads in the center of the fabric between the faces either tying wefts or floating wefts which thus form a cushion between the surface plies and making the carpet soft to the tread. In the bag-weave portions of the fabric there is the same close weaving of the surfaces by warps and wefts interwoven in their respective plies as in the solid weave portions. There are floating weft threads cushioning the surface plies, but as the fabric is in these portions not tied together by either warp or weft threads these floating threads hold the plies slightly apart, producing embossed effects in contrast with the homogeneous portions of the fabric. Thus my improvement secures a closely woven web for each face or exposed surface of the goods. It also secures a fabric that is softer to the tread than either two-ply or three-ply carpet, and yet has in all its surfaces the closely woven character of the bag-weave portions of two-ply carpet, and besides has greater color and design possibilities than either the two-ply or three-ply carpet, and also has embossed effects in portions of the pattern in contrast to other portions of the fabric.

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

1. An ingrain carpet fabric consisting of figuring weft threads and figuring warp threads, the warps being arranged in sets having a less number of threads in a set than the weft threads, said fabric having some of the weft threads of each set interwoven with some of the warp threads at one side of the fabric to form one face of the fabric, some of the remaining weft threads of each set being interwoven with the remaining warp threads to form the other face of the fabric, the fabric being in some parts a solid and homogeneous fabric tied together by some of the weft threads in each set of weft threads in such homogeneous part of the fabric, and the fabric being in other parts an open or bag-weave fabric having one or more weft threads floating between the faces in such bag-weave portions, substantially as and for the purpose set forth.

2. An ingrain carpet fabric consisting of figuring weft threads arranged in sets of eight in a set and figuring warp threads arranged in sets of four in a set, some of the weft threads of each set being interwoven with two of the warp threads of each set to form one face of the fabric, some of the remaining weft threads of each set being interwoven with the two remaining warp threads

of a set to form the other face of the fabric,
the fabric being in some parts a solid and
homogeneous fabric tied together by some of
the weft threads in each set of weft threads
5 in such homogeneous part of the fabric, and
the fabric being in other parts an open or
bag-weave fabric having one or more weft

threads floating between the faces in such
bag-weave portions, substantially as and for
the purpose set forth.

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Witnesses:

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