

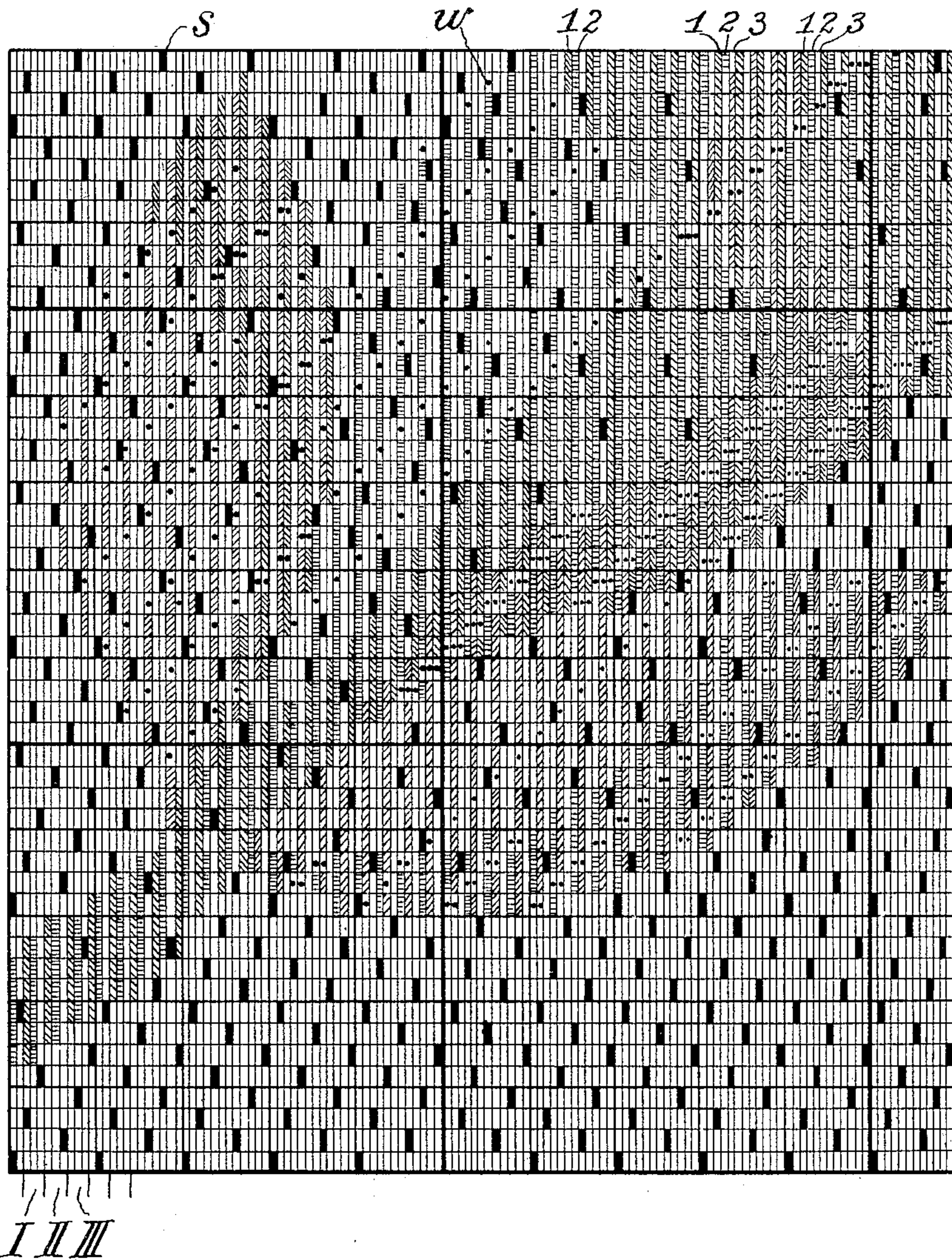
J. SZCZEPANIK.
METHOD OF PRODUCING WEAVING DIAGRAMS.

(Application filed Mar. 19, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses:

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O. W. Sommers

Inventor.

Jan Szczepanik,

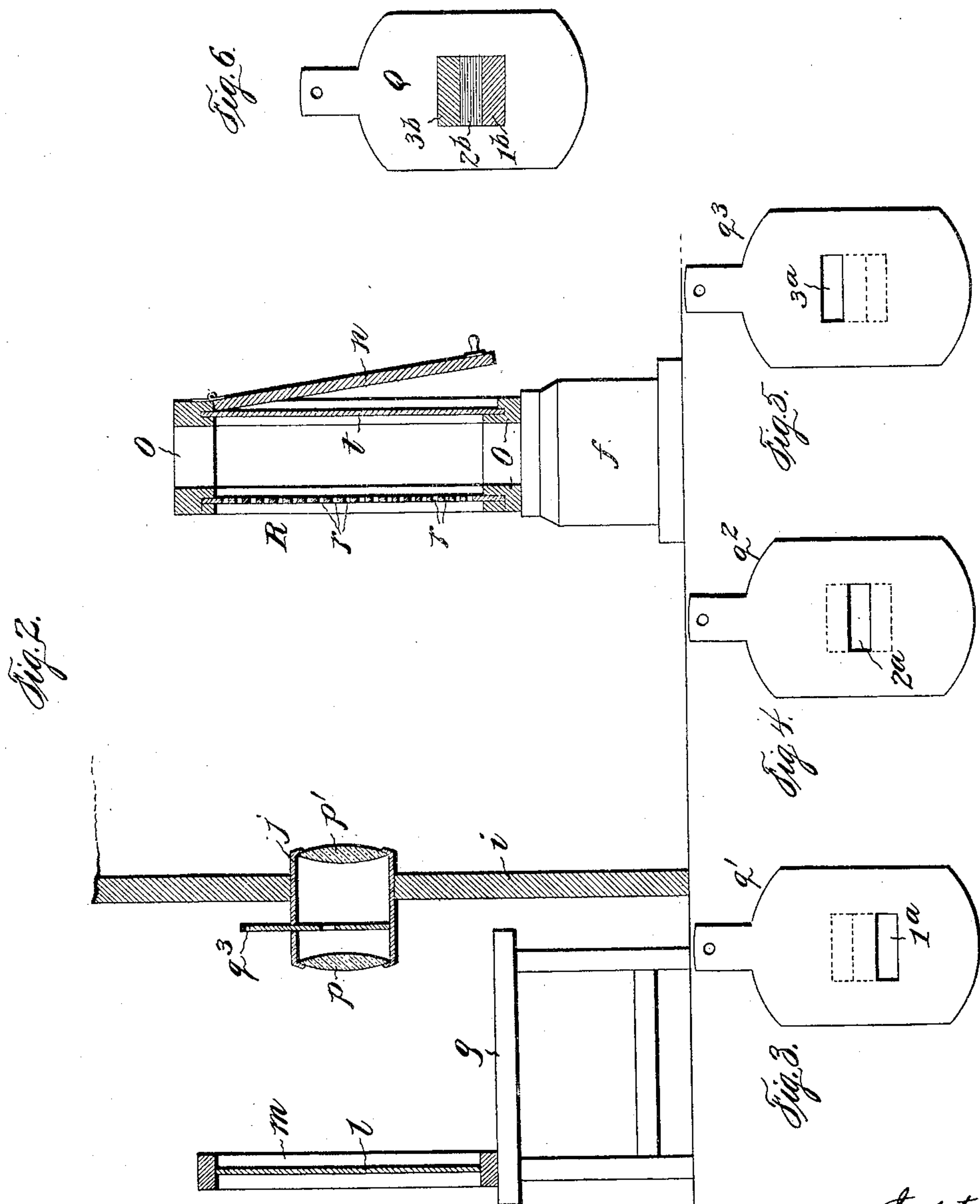
by *Henry M. [Signature]*
Att'y.

J. SZCZEPANIK.
METHOD OF PRODUCING WEAVING DIAGRAMS.

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(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

JAN SZCZEPANIK, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNOR TO SOCIÉTÉ
DES INVENTIONS JAN SZCZEPANIK & CIE., OF VIENNA, AUSTRIA-HUN-
GARY, A FIRM.

METHOD OF PRODUCING WEAVING-DIAGRAMS.

SPECIFICATION forming part of Letters Patent No. 701,418, dated June 3, 1902.

Application filed March 19, 1900. Serial No. 9,331. (No specimens.)

To all whom it may concern:

Be it known that I, JAN SZCZEPANIK, a sub-
ject of the Emperor of Austria-Hungary, re-
siding at Vienna, in the Province of Lower
5 Austria, in the Empire of Austria-Hungary,
have invented certain new and useful Im-
provements in Methods of Production of
Weaving-Diagrams; and I do hereby declare
the following to be a full, clear, and exact de-
10 scription of the invention, such as will enable
others skilled in the art to which it appertains
to make and use the same.

It is known to persons skilled in the art of
weaving that by means of different thread-
15 crossings all shades from white to black can
be produced by means of a white warp and a
black weft, or vice versa. By mixing other
colors—for example, blue, yellow, or red—
with a white weft the same shading effects can
20 be obtained in those colors. By means of
known photographic processes pictures or
images in natural colors can be produced by
decomposing the picture to be reproduced in
lines of different color which follow one an-
25 other in a particular order—for example, in the
succession of blue, yellow, and red, or of the
primary colors. The decomposition of the
colors of the object into primary or the other
set of colors is at present possible only with
30 the aid of color-filters.

The object of this invention is a simple and
effective method of producing weaving cards
or diagrams on which the respective colors
are indicated for three-color reproductions in
35 fabrics.

Referring to the drawings, in which like
parts are similarly designated, Figure 1 rep-
resents a weaving-diagram made in accord-
ance with this invention; Fig. 2, a suitable
40 apparatus for carrying out the method of pro-
ducing the diagrams. Figs. 3, 4, and 5 show
stops used successively, and Fig. 6 represents
a single diaphragm used in effecting the di-
vision of the weaving-crossings in the parts
45 corresponding to the colors used.

If it is desired to weave a picture in silk in
natural colors, it is necessary to use, for ex-
ample, for a white or black warp those wefts
whose colors complement one another to form
50 white. Now if it is desired to exhibit or in-

dicating on the pattern or diagram the required
primary colors for differently-colored weft and
warp threads or combined it is necessary to
first produce three transparencies, negatives,
or diapositives (hereinafter for the purposes 55
of this specification called "diapositives,")
which may be patterned either by hand or by
means of photography, while the different
light and shaded portions (light intensities)
of the several colors are expressed or denoted 60
in accordance with the diapositives by means
of different thread-crossings or indications
thereof. From the three diapositives, each
made for a different color value in a well
known manner with the aid of suitable color- 65
filters—for example, as in three-color print-
ing, where red, blue, and yellow are the colors
used—an impression corresponding to a red
line, then from the next diapositive an im-
pression corresponding to a yellow line, and 70
finally an impression corresponding to a blue
line is made.

The object or the diapositive l is placed in
a suitable position in a frame m on a stand
 g in front of a lens preparatory to being 75
copied. In the front wall i of a suitable dark
room or chamber is a lens-barrel j , having a
front lens p and a rear lens p' . Said lenses
may be either single or compound. Inserted
in the barrel, similar to Waterhouse stops, is 80
the diaphragm q' , q'' , q''' , or Q , the purpose of
which will be described hereinafter. The
stand f within the dark room supports a
frame o , carrying in its forward end a perfo-
rated plate or suitable screen R , the openings 85
or light-transmitting portions of which are
arranged in the form of a weaving-stitch, and
at the rear end is a hinged frame n , carrying
a focusing-screen and adapted to be moved
out of the way to insert a suitable plate, 90
bromid-paper, or other sensitized medium t ,
upon which the pattern or design is to be
made. Now if on exposure a stop were used
that had a square opening in it each of the
perforations or light-transmitting portions r 95
of the plate R would cause a square to be
made on the sensitized medium, and if no ob-
ject or diapositive were in front of the lens
every square would be of the same intensity.
If we place an object or diapositive in front 100

of the lens, then the image will be broken up by the plate R into squares, the intensities of which are dependent upon the relative light-reflecting values of the surface of the object or light-transmitting values of the diapositive. This procedure would give us for each thread-crossing or weaving-stitch a square; but the square would not indicate color values. I wish to have this indicated on the diagram or card, so that each thread-crossing may be divided into a plurality of parts—say three—one for each of the primary colors or one for red, one for yellow, and one for blue. To do this, the square diaphragm-opening is divided into three parts either vertically or horizontally, according as it is desired to indicate warp or weft, or, what amounts to the same thing, the diaphragm is either inserted in the side of the barrel or the barrel rotated ninety degrees, according to the convenience of the operator. That diapositive to be copied for one end position of the group of threads—say blue—is placed in the frame *m*, and the stop *q'*, Fig. 3, having the opening 1^a, is used and exposure made to indicate the color value of the blue in the design and represented at 1 in Fig. 1 by lines slanting downward from left to right. Then the second diapositive is placed in the frame and the diaphragm *q*², having the opening 2^a, is used, exposure is made, and this color value—say yellow or the required shade of green—indicated on the diagram, as indicated at 2 in Fig. 1 by horizontal lines, and finally the last diapositive is placed in the frame *m* and the stop *q*³, Fig. 5, having the opening 3^a, is used, exposure made, and the color value for red indicated on the diagram, as indicated at 3, by lines slanting downward from right to left.

Instead of first making several diapositives from the object the colored object may be copied directly by means of a stop Q, Fig. 6, in which a square opening is shown divided into three parts. Each part 3^b, 2^b, and 1^b contains the required color-filter. In this manner the picture is decomposed in the diagram—for example, into three lines—that is to say, three wefts 1, 2, and 3—while each line (each weft-thread) corresponds to a primary color or to either blue, yellow, or red.

Just as the present three-color printing requires for known optical reasons a fourth printing—viz., a black one—in order that the picture may be very distinct, so in the present case also certain portions can be expressed more strongly by means of a black warp or a black weft *s*. (Indicated on the diagram by any suitable means to accentuate the shadows.) The color of the weft or of the warp must, of course, be examined by means of a spectroscope, so that they may harmonize with the color-filters used.

It is evident that all three diapositives must completely cover or register with one another when patterning or diagram-making. As this may entail some difficulty, the process

can be simplified by making a special diagram or special paper for each single diapositive—*i. e.*, for each single color. Accordingly when punching the cards in accordance with all three diagrams the cards must be fastened in the order in which the wefts are to follow one another.

The fineness of the picture will be always dependent on the closeness of the threads. As the warp can be much closer and finer than the weft, it is better to employ all three colors in the warp. The order of the warp will then be first a blue, then a yellow or the required shade of green, and then a red warp-thread. All three warps can be treated as a single warp and the same thread-crossing can be always used for all three warps. With a certain thread-crossing it happens that at one crossing all three threads appear simultaneously, then again only two, and sometimes even only one. The remaining warp-threads are covered in this case by a white weft *w*, Fig. 1, whereby high lights may be made prominent. This kind of fabric imitates most accurately the method of Joly's or McDonough's color photography.

This method is not only suitable for shaded pictures, but also for flat multicolored ornamentation, and can be used with advantage not only in silk-picture weaving, but also in other branches of the textile industry, as instead of the cumbrous process of producing the color by means of several multicolored wefts the present method is employed, by means of which not only the same result is attained in a simpler and cheaper manner, but also a more artistic color effect can be obtained.

Having thus described my said invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The method of producing diagrams for weaving multicolored fabrics, which consists in dividing in one direction the fields that represent stitches on a sensitive medium into three parts, producing monochrome diapositives from a suitable object, exposing each of the parts of the aforementioned fields to the action of light passed through one of said diapositives and a suitable screen arranged to indicate a weaving-stitch, substantially as described.

2. The method of producing diagrams for weaving multicolored fabrics, which consists in dividing the fields that represent stitches on a sensitive medium into three parts in the warp direction, producing monochrome diapositives and exposing said sensitized medium to the action of light passed through the diapositives, and a screen arranged to indicate a pattern-stitch, whereby each stitch in the warp direction will be represented by three colors, substantially as described.

3. The method of producing diagrams for weaving multicolored fabrics, which consists in dividing the fields that represent stitches on a sensitized medium into three parts in the

warp direction, exposing each of said parts to the action of light passed through the diapositives and a screen arranged to indicate the particular weaving-stitch to be used, 5 whereby each stitch in warp direction will be represented by the three primary colors, and indicating the weft-bindings by suitable means, substantially as described.

10 4. The method of producing diagrams for weaving multicolored fabrics, which consists in indicating the arrangement of the warp-threads, each of which is composed of three colors and arranging the indication of weft-threads of white or black to bind and combine 15 warp-threads and parts of warp-threads to produce high light and shadow, substantially as described.

5. The method of producing diagrams for weaving multicolored fabrics, which consists in indicating the arrangement of the threads 20 in one direction, each of which is composed of three parts each of a different color and arranging the indication of black threads in the other direction to accentuate the shadows, and white threads also in the other direc- 25 tion to accentuate high lights, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JAN SZCZEPANIK.

Witnesses:

ALVESTO S. HOGUE,
AUGUST FUGGER.