

M. A. McKEE.
ART OF COLOR PRINTING.
APPLICATION FILED MAY 10, 1904.

2 SHEETS—SHEET 1.

Fig. III.

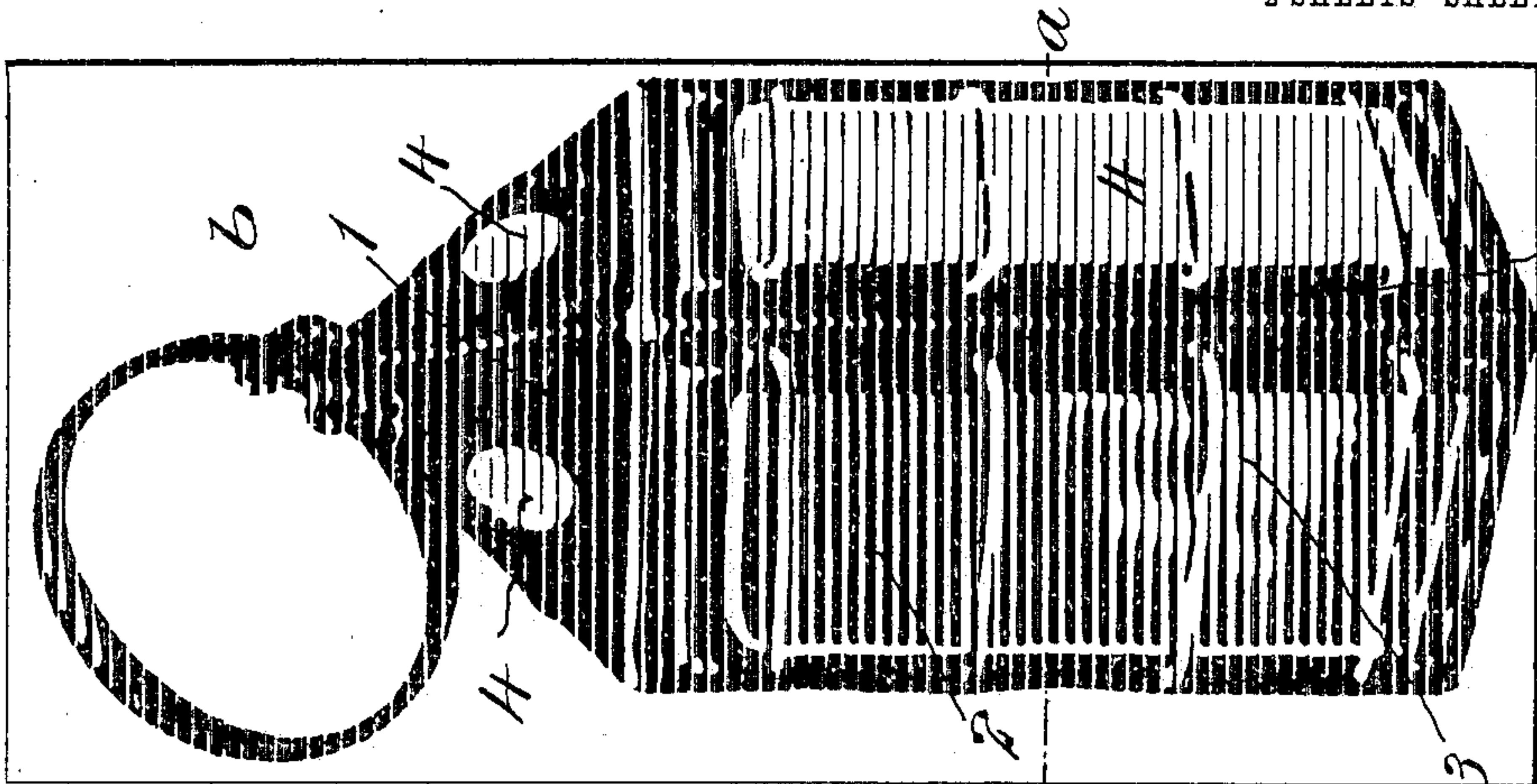


Fig. II.

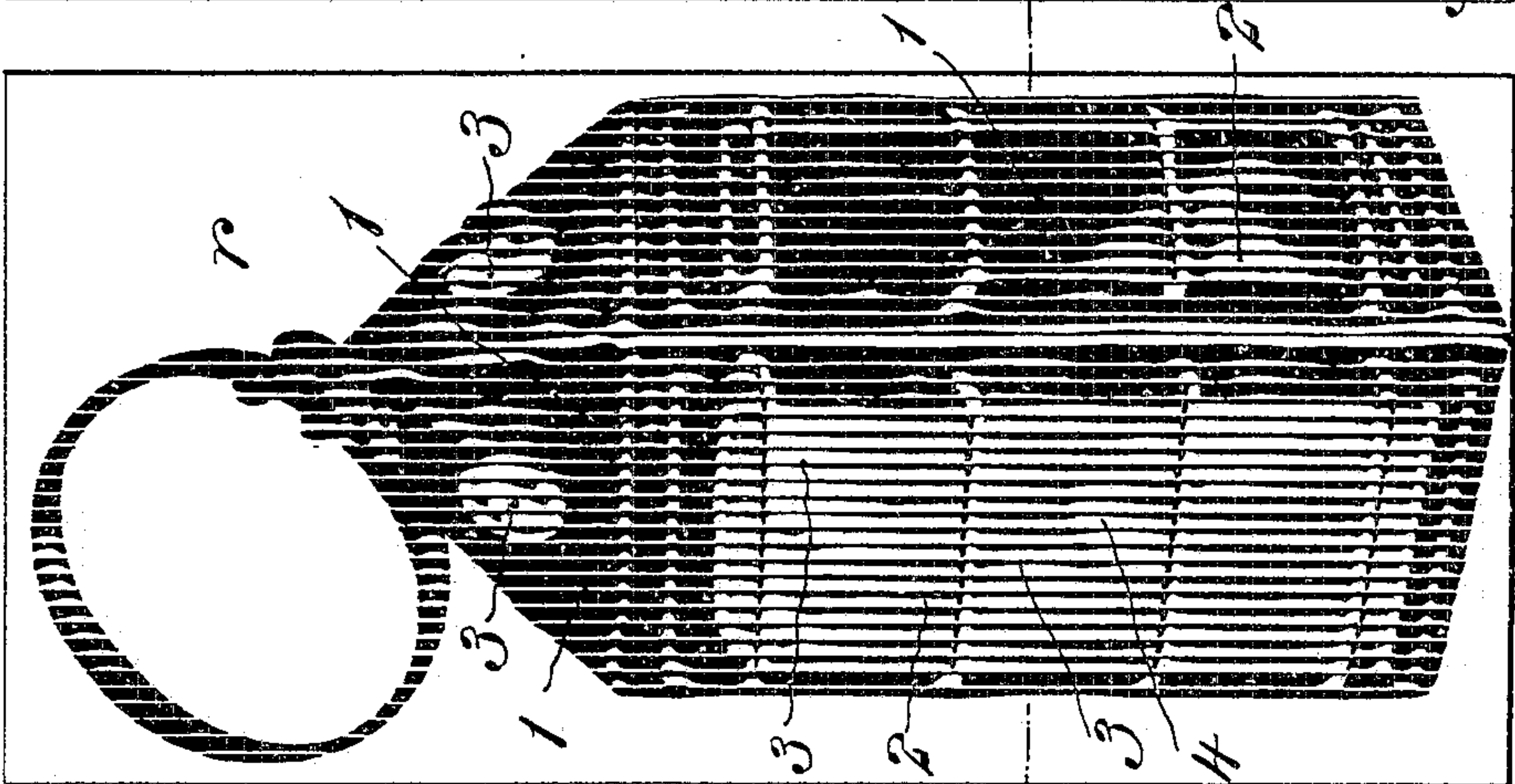


Fig. I.

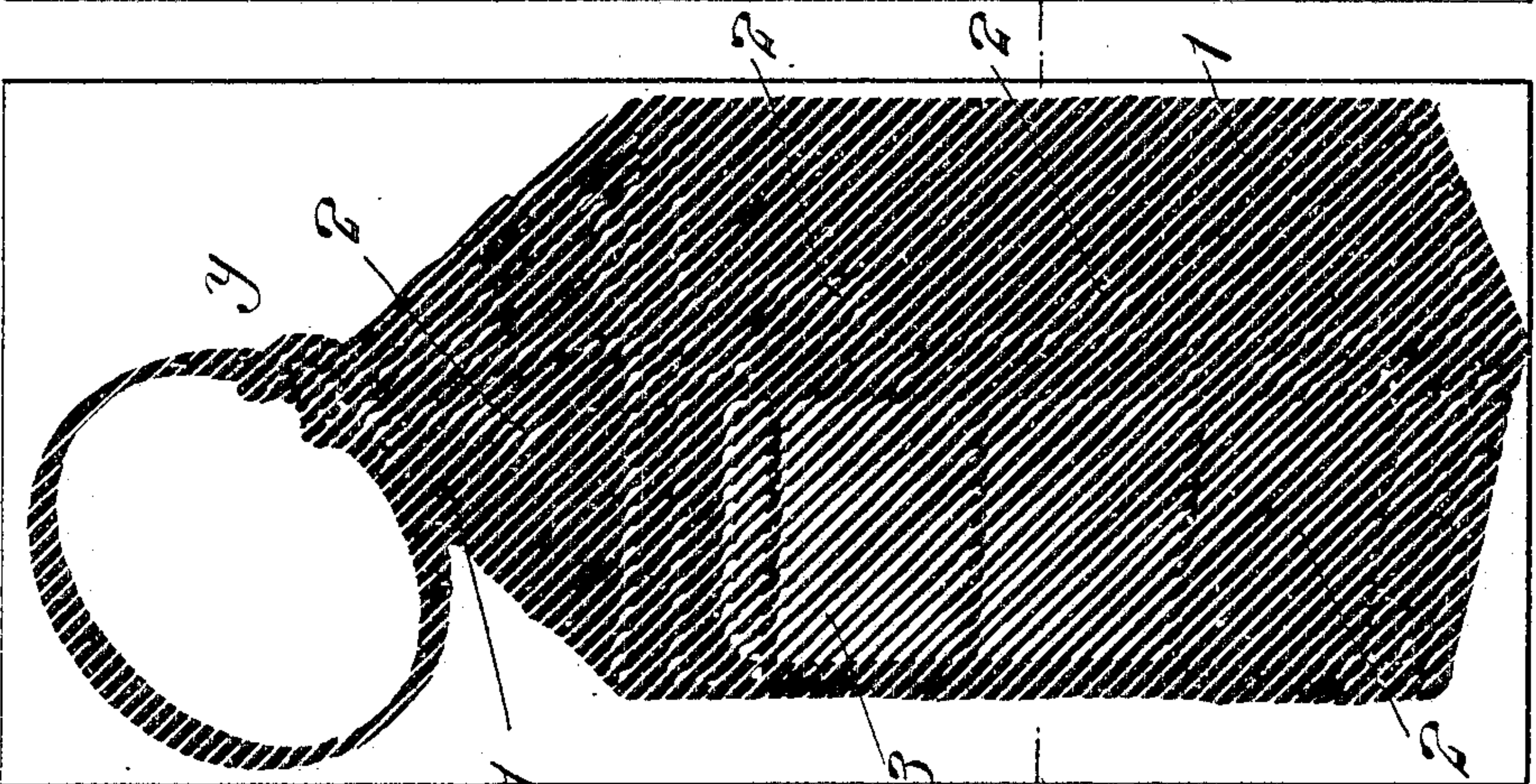


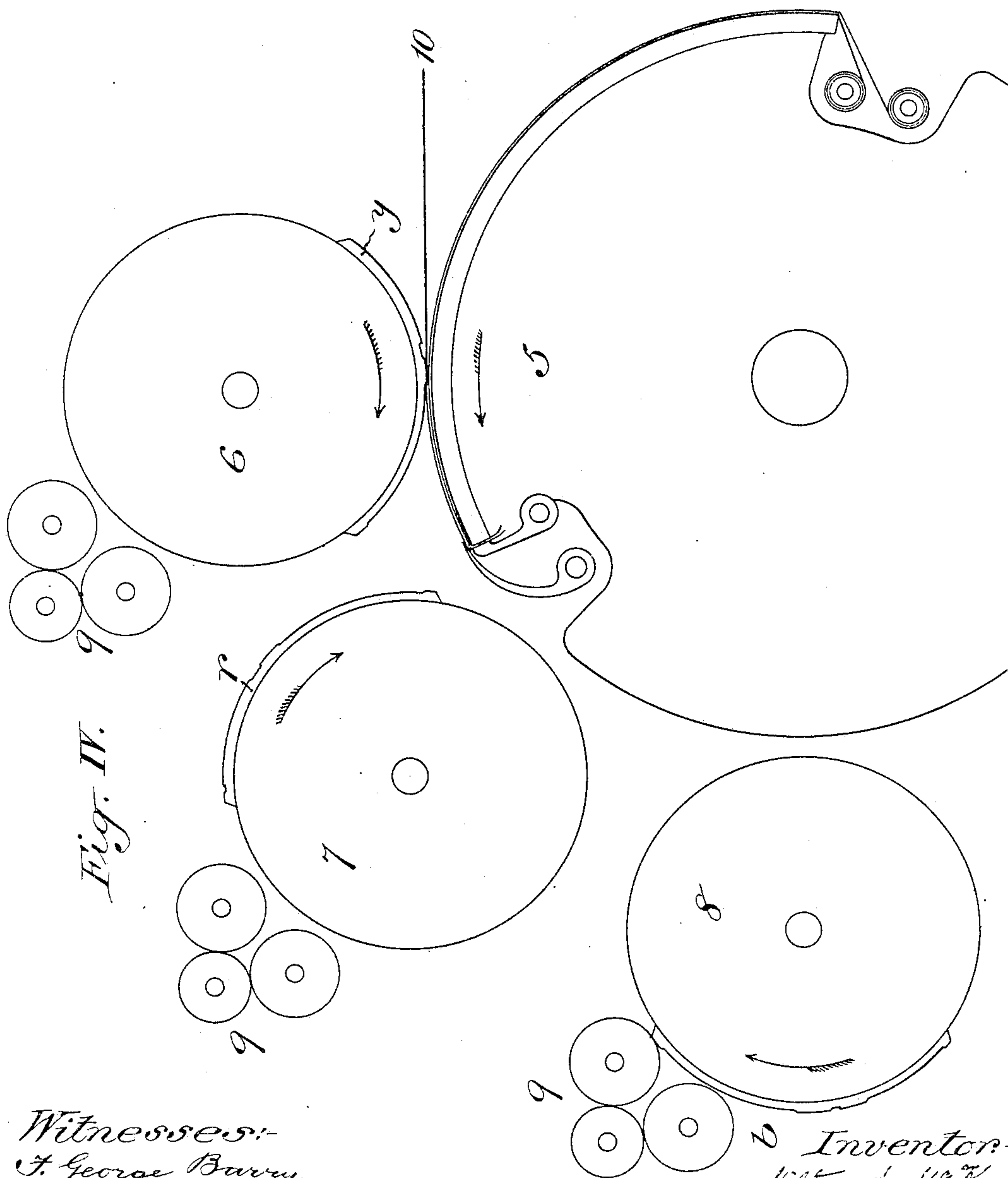
Fig. I. 3 1 2 1 3
Fig. II. 3 4 1 2 1 3
Fig. III. 2 3 1 4 1

Witnesses:
F. George Barry
Henry Thieme

Inventor:
Milton A. McKee
by attorney
Brown & Howard

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2 SHEETS—SHEET 2.



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Henry Thieme.

Inventor:
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UNITED STATES PATENT OFFICE.

MILTON A. McKEE, OF NEW YORK, N. Y., ASSIGNOR TO C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

ART OF COLOR-PRINTING.

SPECIFICATION forming part of Letters Patent No. 787,209, dated April 11, 1905.

Application filed May 10, 1904. Serial No. 207,202.

To all whom it may concern:

Be it known that I, MILTON A. McKEE, a citizen of the United States, and a resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Improvement in the Art of Color-Printing, of which the following is a specification.

This invention consists in the continuous process hereinafter described and claimed of printing in colors in which there are employed a plurality of printing-plates, one for each color, having what is known as "make-ready" in their own faces—that is to say, each of said plates having in its own printing-surface and the several plates having in their respective printing-surfaces gradations, according to the heavier and lighter printing pressures required for the different parts of each plate and for the different plates. The several plates are employed in combination with a means for producing a printing impression—the impression-cylinder of a printing-press, for example—which is common to all of them, the supports for said plates and said means for producing the impression being so mounted, proportioned, speeded, timed, geared, and registered together that the impressions from the several plates will be taken or given upon one and the same portion of the sheet or web to be printed.

For carrying out this invention the make-ready in the faces of the plates may be produced in any suitable manner—for example, by the process which is the subject of my application for United States patent, Serial No. 86,789, filed December 21, 1901, the principal feature of which consists in mechanically producing gradations or differences of printing-level in different parts of the face of a printing-plate by pressure in a matrix. The invention may be performed in any suitable printing-press—for example, a press having one impression-cylinder and as many form-cylinders as there are colors to be printed.

In the simple example which I have selected for the illustration and explanation of my invention three printing-plates only are used for as many colors—viz., yellow, red,

and blue—these being sufficient to produce colored pictures of great attractiveness, though for greater effectiveness a fourth plate for black may be used and other additional plates for other colors may be used with still greater advantage.

In the accompanying drawings, Figures I, II, and III represent the faces of the three made-ready printing-plates; Figs. I^a, II^a, and III^a, sections of said plates I, II, III, respectively, in the lines *a* thereof, showing the differences of the printing-levels; and Fig. IV, a diagram of one end of the impression-cylinder and of each of the three plate-cylinders of a rotary color-printing press in which my plates for printing the three colors are employed.

In the face views of the plate the printing-surfaces are designated by shade-lines running in different directions, these lines on the yellow plate *y*, Fig. I, running diagonally, those on the red plate *r*, Fig. II, vertically, and those on the blue plate *b*, Fig. III, horizontally. The gradations of the printing-surface are represented by gradations of the shade-lines, the thicker lines and portions of lines indicating the higher parts of the surfaces which are to print with heavier pressures and the thinner lines indicating the lower parts of the surface which are to print with lighter pressures. By a comparison of this shading in the face views with the sectional views of the plates, the corresponding portions of the plates having similar reference-numerals in the two sets of figures, it will be seen that the plates are somewhat thicker and thinner in different parts, according to the heavier and lighter impression which they are to produce. This difference of thickness is represented somewhat exaggerated in the sectional views for the sake of greater perspicuity.

The yellow plate, Figs. I and I^a, is represented as having the greatest surface of the three for the heaviest impression. All the parts marked 1 are at the highest and strongest level, the parts marked 2 at the level just below, and the parts marked 3 the lowest level. There are only three gradations or

levels in this plate. The red plate, Figs. II and II^a, is represented as having four gradations or printing-levels. The parts marked 1 are at the highest and strongest printing-level, the parts 2 being at the next lower level, the parts marked 3 at a still lower level, and the parts 4 at the lowest level. These last give the lightest impressions. In the blue plate, Figs. III and III^a, there are also four gradations, marked 1, 2, 3, and 4, as in Figs. II and II^a.

It may be seen by a comparison of the Figs. I, II, III that the plates all have a different character, the most conspicuous difference being between the yellow and the blue plates, the part 4 in the last-mentioned for producing the lightest impression corresponding in position with one of the parts 1 of the yellow plate which produces the heaviest impression.

In whatever description of printing-press the printing with these plates is to be performed the impression-cylinder and the plate-supports must be so mounted, proportioned, speeded, timed, geared, and registered together that the impressions will be taken or given upon the same portion of the circumference of the impression-cylinder.

The diagram Fig. IV, representing the impression-cylinder 5 and three plate-cylinders 6 7 8 and parts of three sets of inking-rollers 9 for the several plate-cylinders of a known form of color-printing press, will be sufficient to render intelligible to those skilled in the arts of printing machinery and printing how the printing from the plates described may be performed, the plate-cylinders and impression-cylinder being so proportioned in circumference, the plate-cylinders being at such distance apart, and the plates being so set upon their respective cylinders and the impression and plate cylinders being so geared together and registered that the plates will all come exactly into register with each other and opposite exactly the same part of the impression-cylinder. The act of printing may be performed either on a sheet or upon a continuous web 10.

In the diagram Fig. IV, in which the direction of the revolution of the several cylinders is shown on them by arrows, the yellow plate on the cylinder 6 is represented as printing. After the said plate has passed the part of the impression-cylinder 8 by which the impression is given the revolutions of the said cylinder and of the cylinder 7 will bring the red plate *r* around in time to print the red impression upon the yellow one. After this impression has been made the continued revolution of the impression-cylinder and of cylinder 8 will bring round the blue plate *b* in time to print the blue impression upon the red one. The three impressions now having been given directly one upon another in ex-

act register will have produced a perfect picture in color.

I have described particularly for illustration of my invention the printing with three colors, as it is probable that three will be the number very commonly used; but it will be obvious that for some work only two might be produced and for other work many more might be used.

In carrying out this invention as described no make-ready, such as is common, is required upon the impression-cylinder or tympan of the printing-press, and, in fact, no such make-ready would be practicable, because the separate color-plates having different color-printing values all strike upon one place on the impression-cylinder and require different strengths of impression at corresponding parts of their several faces. Suppose, for example, that any color-plate has at one point or part a dark printing tone, requiring considerable ink and necessarily a strong printing impression, the next succeeding color-plate might be of a character the very reverse, having a light printing tone, requiring a light printing impression at the point or part corresponding with the dark point or part of its predecessor. It would be impossible under these conditions to add to the impression-cylinder any pieces of paper such as constitute an ordinary overlay for the benefit of the dark point or part in the one plate without increasing too much the impression at the corresponding point or part of the said succeeding plate, which might require a very light printing impression. It is therefore impossible by the hitherto known means and processes for multicolor-printing to produce by a continuous operation consisting in one passage of a sheet through a press a picture in which the differing color values of corresponding parts of two or more color-plates would be effectively brought out. Therefore it has been customary for the finest multicolor-printing to print in only one color at a time at each passage of the sheet through the press, requiring as many separate and independent printings as there are colors employed.

What I claim as my invention is—

1. The improvement in the art of color-printing which consists in printing in different colors by a continuous operation upon the same portion of a sheet or web from plates one for each color, in the faces of which there are gradations of printing-level according to the heavier and lighter printing impressions required from different parts thereof and in one of which plates the said gradations differ from those of another or others.

2. The improvement in the art of color-printing which consists in first preparing a plurality of printing-plates one for each of

the colors to be printed, each of said plates having in its face gradations according to the heavier and lighter printing impressions to be produced by different parts thereof and the said gradations differing in the several plates according to the difference of pressure required on or from their corresponding parts, and then printing from said plates successively with a different color for each on the same portion of a sheet or web to produce a colored picture.

3. The improvement in the art of color-printing which consists in first preparing a plurality of printing-plates one for each of the colors to be printed, each of said plates having in its face gradations according to the heavier and lighter printing impressions to be produced by different parts thereof and the said gradations differing in the several plates, next mounting said plates on differ-

ent supports and then by a continuous operation printing from said plates successively with their respective colors on the same portion of a sheet or web.

4. The improvement in the art of color-printing which consists in printing successively upon the same portion of a sheet or web from a series of plates each having "make-ready" formed in its face and the "make-ready" being different in the different plates.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 6th day of May, 1904.

MILTON A. McKEE.

Witnesses:

FREDK. HAYNES,
C. S. SUNDGREN.