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COLOR PRINTING APPARATUS.

(No Model.)

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Fig. 1.

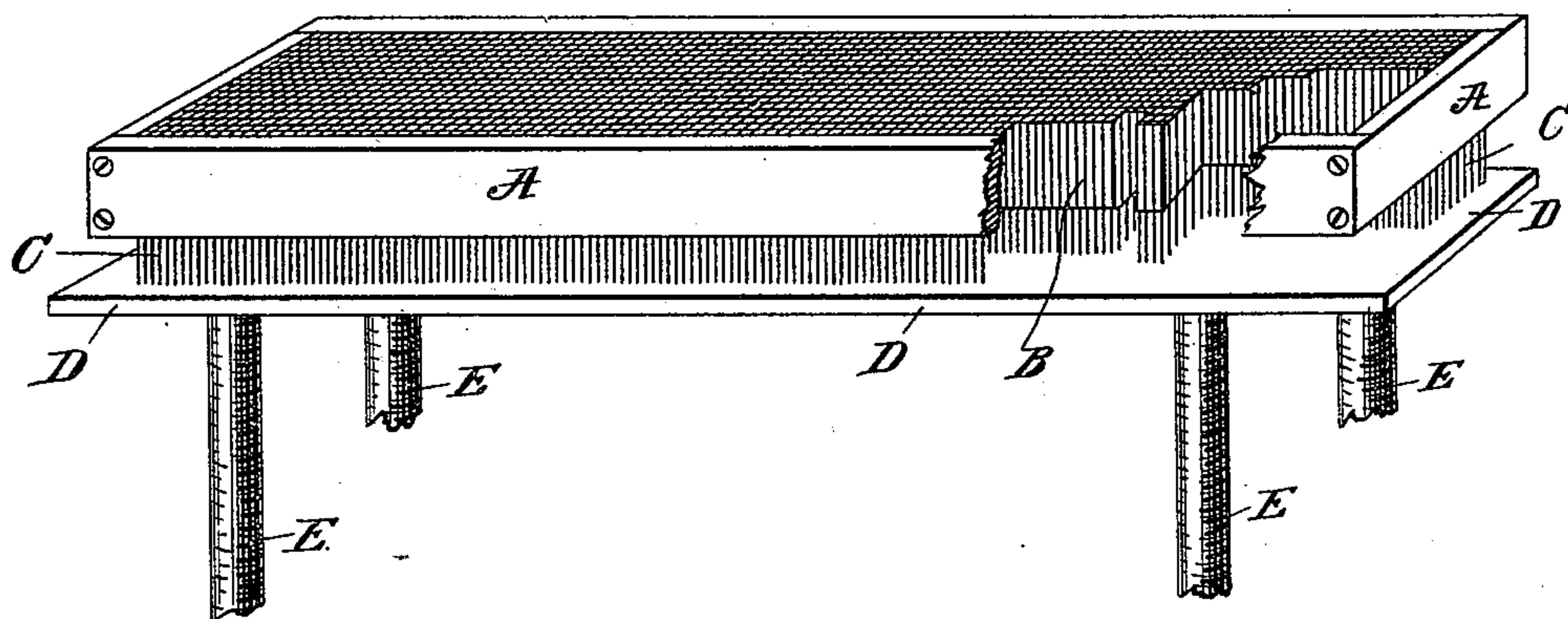


Fig. 2.

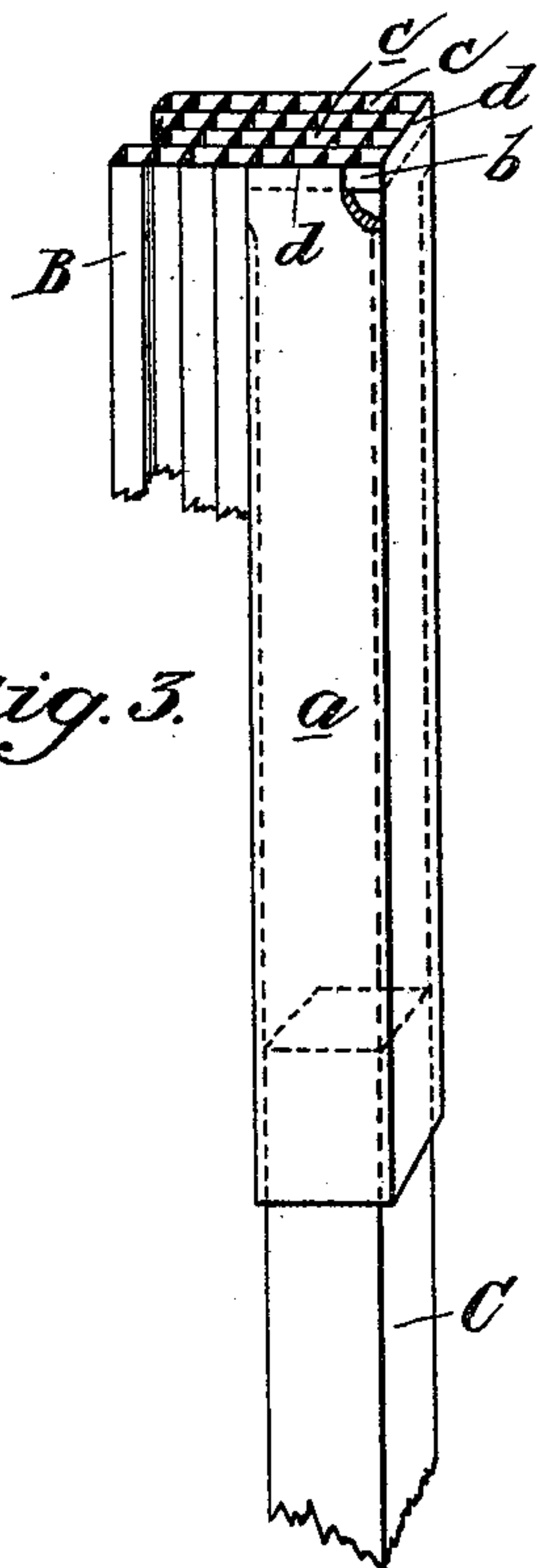
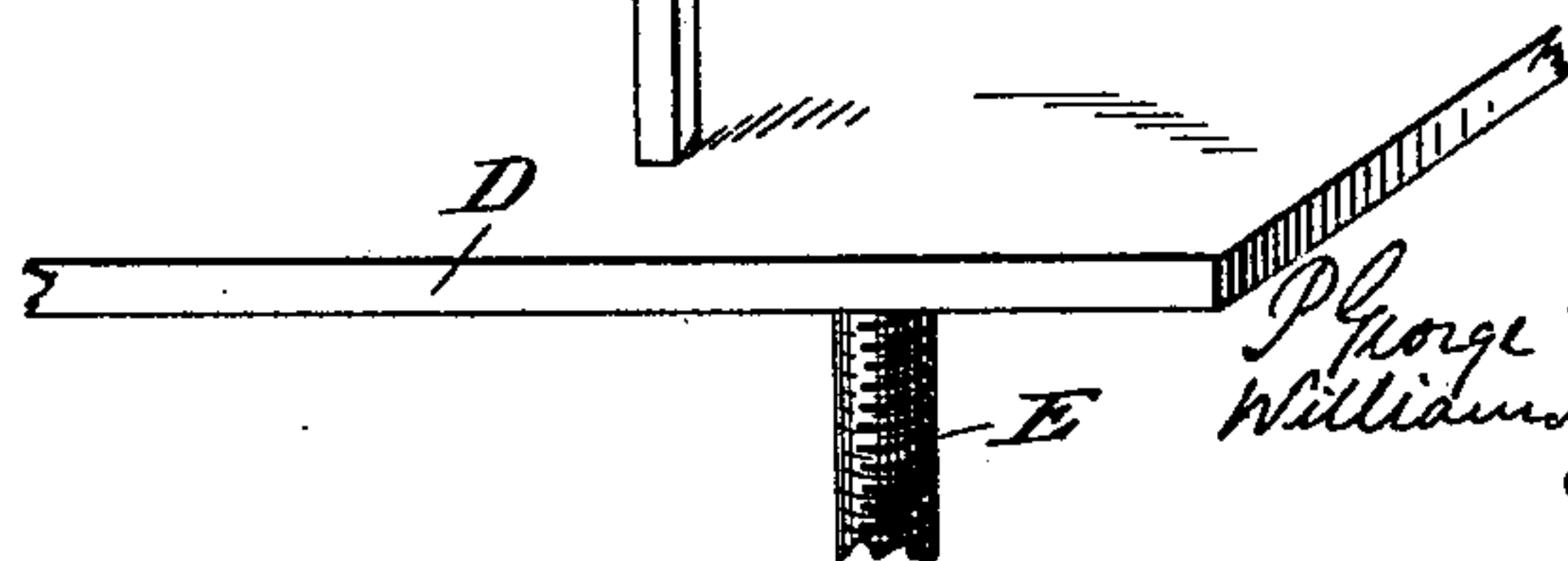
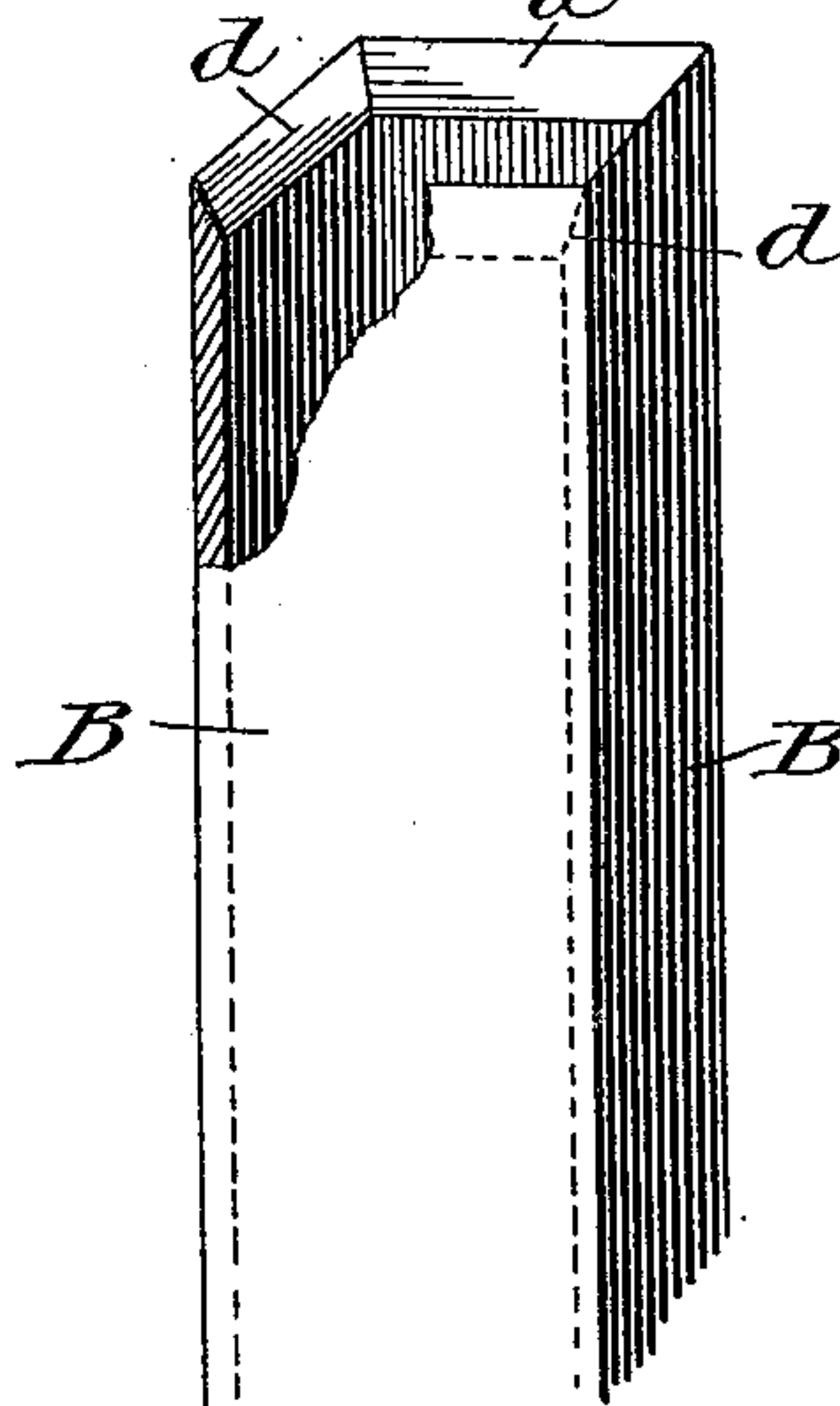


Fig. 3.



Fig. 4.



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PAUL GEORGE FRAUENFELDER AND WILLIAM H. MCENTEE, OF
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COLOR-PRINTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 637,380, dated November 21, 1899.

Application filed February 23, 1898. Renewed October 24, 1899. Serial No. 734,682. (No model.)

To all whom it may concern:

Be it known that we, PAUL GEORGE FRAUENFELDER, a citizen of the Republic of Switzerland, and WILLIAM H. MCENTEE, a citizen of the United States, both residents of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Color-Printing Apparatus, of which the following is a specification.

Our invention relates to improvements in so-called "multicolor-printing" apparatus in which an inking-surface is so constructed as that a plurality of different colors may be applied from it upon the paper or other surface upon which the impression is to be made at one and the same operation, so that all of the colors contained in a given picture or printed matter or design may be transferred directly to the proof or impression by one and the same operation and without the necessity of printing the different colors separately, as in the lithographic and similar processes now practiced.

In the apparatus referred to above a large number of tubes, preferably square, which contain ink of different colors or shades, are employed. These separate tubes are adapted to be distributed in cases after the manner of ordinary type and may be set up in a composing-stick and placed in a printing-frame somewhat the same as ordinary type. The ends of these tubes are both open, and in use their upper surfaces or ends, which are to discharge color, are all arranged in the same plane, and the surface thus formed is that from which the impression may be taken directly or indirectly, as now well understood. The tubes are each provided with a plunger or piston which fits the interior of the tubes with the requisite exactness to eject the ink in them respectively and prevent leakage. Below the frame containing these tubes is placed a movable platen or table so arranged and constructed that its surface can be brought in contact with the lower ends of all the plungers in such manner that as the ink is taken from the upper ends of the tubes by the successive impressions the platen-plate may be elevated by exceedingly small degrees, so as to force the color in the tubes up-

wardly that it may always be presented at the printing-surface.

The accompanying drawings illustrate the apparatus referred to in them.

Figure 1 illustrates a perspective view of the apparatus. Fig. 2 illustrates a perspective view, enlarged, of so much of the apparatus as will disclose the use and arrangement of the plungers, &c. Fig. 3 illustrates a modified construction. Fig. 4 illustrates an enlarged view of one of the tubes, showing the sharpened or inclined upper edges thereof.

A illustrates a frame, which may be of any preferred construction. In practice it is supported against the pressure of the platen of the press in any suitable manner. (Not shown.)

B are the tubes, (best shown in Fig. 2,) preferably square in outline. They are made of metal or other suitable material and may be of such size as the requirements of the work necessitate. For coarse work, such as bill-posters and the like, they may be as large as one-eighth of an inch in diameter and from that down to such size as desired, say one thirty-second of an inch.

C is one of the plungers. It is or may be a square piece of metal and has one end inserted in the tube, with its lower or opposite end resting on platen D, which is preferably made of metal. The platen is supported upon threaded rods E E, &c., the threads on which are preferably made of exceedingly low pitch, so that by proper turning of the rods the table or plate D, carrying the plungers C, may be elevated by exceedingly small degrees. The devices for turning the rods E are not shown. Any suitable mechanism may be employed, preferably such as will turn them all simultaneously. These tubes are provided in large numbers, so that for each color there will be a large number of tubes, the same as for each letter of the alphabet there are a large number of individual type. The tubes are sometimes made oblong in shape instead of square, so that the setting of the type or tubes may be more rapid where a large space of the same color is to be printed. For example, suppose it is desired to reproduce a design in which the detail or intricate parts requires the use of tubes one-sixteenth of an inch in diameter,

but in the design there are also large expanses of "solid" or unbroken color. For producing these masses of color we employ one part of our present improvement—*i. e.*, we use larger tubes *a*, (see Fig. 3,) which may be oblong or square or of any preferred shape, and in the upper or printing end of such tubes a plug *b* is fitted, this plug being perforated, as at *c*, so as to form partitions corresponding with the one-sixteenth-of-an-inch openings of the other tubes, so that although we use these large tubes provided with the perforated plug in combination with small tubes the printing-surface presents an unbroken plane of one-sixteenth-of-an-inch holes or openings. The reason for inserting the plug with its plurality of small holes is so that the ink cannot be lifted bodily or in relatively large pendulous drops or globules from the large tube which might otherwise take place. A large tube in combination with small ones is illustrated in Fig. 3.

In order to secure greater perfection in the work, we employ another improvement invented by us—that is to say, at the upper or printing ends of the tubes *B*, which constitute the printing-surface, we bevel off the metal from the inside of the tubes outwardly and upon all its sides, as shown best at *d d* in Fig. 4, so as to present as thin an edge as possible. When this is done, the color will ordinarily practically, if not completely, join at the adjacent edges, so that the print will present unbroken color-surfaces, such faint lines of demarcation as may in places be present being imperceptible.

The operation is as follows: The printer has before him his pattern for the production of the desired print, which may be a bill-poster, a wall-paper pattern, illustrated catalogue work, illuminated print, or whatever it may be, and after becoming skilled, using that as a pattern, taking measurements, if necessary, he quickly sets up the tubes of such colors as are necessary to produce the pattern before him. We sometimes cover the design to be reproduced with lines running at right angles, thus forming squares to correspond with the ends of tubes in the printing-plate. By the aid of this chart the operator is enabled to place the tubes with reference to the pattern of the design, just as in needle-work the stitches are taken according to the warp and woof of the fabric. These tubes are set up in a frame, such as the frame *A* shown in the drawings, and after having been duly squared

on their ends to present a continuous smooth surface they are clamped within the frame in any suitable manner, and then the frame, with the tubes in it, is placed in the printing-press over the plate *D*, so that the lower ends of the plungers will rest against the plate *D*. We do not show the details of the construction of the press. Various devices may be employed for the purpose, as is now well known. It will be borne in mind that the ink in each of the tubes is always supposed to be at the same level, and when it has become substantially exhausted new tubes will be furnished or the old ones refilled; but it is better to use tubes of sufficient length to contain the color necessary for the edition. After the preliminary impressions have been taken the printing proceeds by taking successive impressions, the same as in ordinary printing, excepting that all the colors are applied to the sheet at one and the same operation, and from time to time, as required, the screws *E* are given a turn or partial turn to elevate the plungers as necessary to maintain the ink at the printing-surface. In this way any desired design may be quickly and effectively produced.

The invention is not adapted to do exceedingly fine work, because obviously the printing is in the form of square stipples or dots; but since these can be reduced to very small dimensions, as stated, the degree of perfection in finish in the prints that can be produced is much greater than would be expected. Indeed very good work for periodicals, illustrated catalogues, &c., can be done by this means, and the invention is peculiarly useful in printing wall-paper, bill-posters, and the like, and also for calico-printing.

We claim—

1. A color-printing type comprising a tube, the upper edge of which is beveled off from within outwardly and filled with colored ink, for the purposes set forth.
2. A type for color-printing comprising a tube adapted to contain colored ink, a plunger for ejecting said ink, and a perforated plug or cap at the end of the tube, whereby its opening is divided into a series of separate sections, for the purposes set forth.

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