A. H. SMITH.

ART OR METHOD OF MULTICOLOR PRINTING FROM INTAGLIO OR UNDERSURFACE PRINTING PLATES.

APPLICATION FILED NOV. 29, 1913.

1,260,824.

Patented Mar. 26, 1918.

2 SHEETS—SHEET 1.

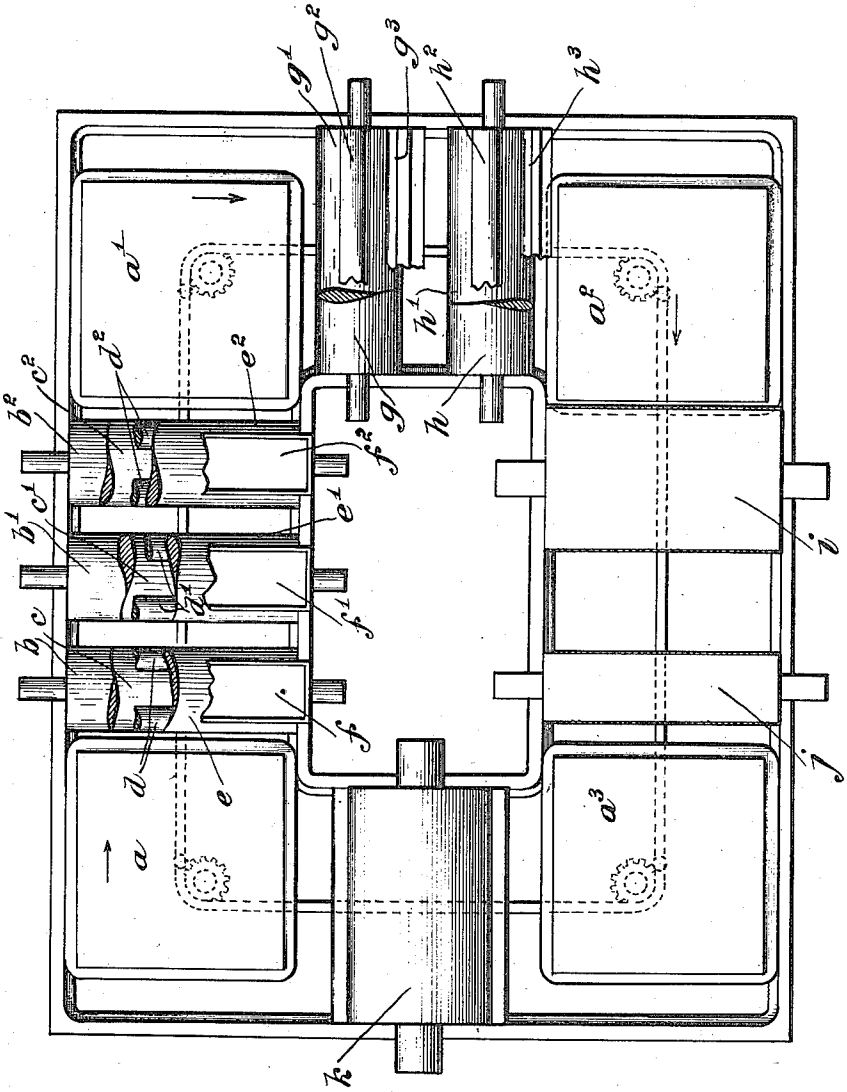


Fig. 1.

Attest:

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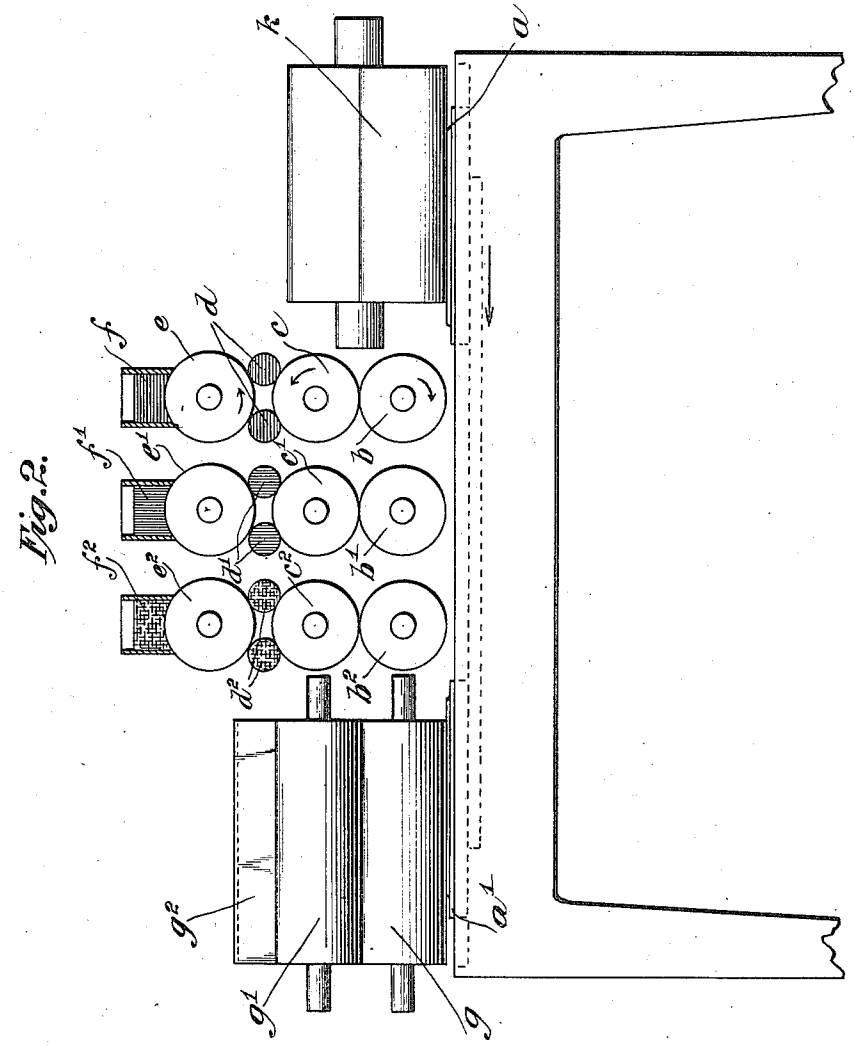
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

AMOS H. SMITH, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN BANK NOTE COMPANY, A CORPORATION OF NEW YORK.

ART OR METHOD OF MULTICOLOR-PRINTING FROM INTAGLIO OR UNDERSURFACE PRINTING-PLATES.

1,260,824. Specification of Letters Patent. Patented Mar. 26, 1918.

Application filed November 29, 1913. Serial No. 803,675.

To all whom it may concern:

Be it known that I, AMOS H. SMITH, a citizen of the United States, residing at the borough of Bronx, in the city of New York, county of Bronx, and State of New York, have invented certain new and useful Improvements in the Art or Methods of Multicolor-Printing from Intaglio or Undersurface Printing-Plates, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to an art or method of multi-color printing from intaglio or undersurface printing plates, and more particularly to an art or method by which an imprint in a plurality of colors may be made at a single impression.

The art of printing may be divided into two general classes, surface printing, and undersurface printing. The first class embraces printing from cameo plates, in which the printing surfaces are raised and the non-printing surfaces are depressed, and printing from planographic plates, in which the printing surfaces are treated to have an affinity for ink, and the non-printing surfaces are treated so as to be repellent to ink.

In the second class, the printing is from intaglio plates, the lines of which are adapted to retain or secrete ink, and the top or non-printing surfaces of which are cleaned by wiping and polishing prior to the taking of each impression.

In the first class, multi-color printing has been successfully accomplished by the use of a sequence of plates bearing different portions of a design in relief, (as to cameo printing), or in planographic printing, by the use of a plurality of stones, or zinc or analogous plates, each bearing portions of the design in colors, or by means of a rubber jacketed offset sheet or cylinder upon which the different portions of the design in colors are transferred by planographic plates or stones the imprint being made from said offset printing surface.

In printing from undersurface or intaglio plates, however, the conditions are such that the methods applied to multi-color surface printing are not applicable, and so far as I am informed, the only attempt heretofore made to print in a plurality of colors from a single intaglio plate embraces as an essential characteristic, the inking and wiping of a plate through a plurality of stencils, one stencil for each color to be used.

With this state of the art in mind, I contemplate by my improved art or method, the production of multi-color prints from a single intaglio plate and at a single impression, which result I accomplish by inking different portions of the plate with inks of different colors, the ink deposited upon the non-printing portions of the plate being removed in large part therefrom unaccompanied by any wiping action, so as to permit the subsequent wiping and polishing of the plate.

As distinguished from the method of inking plates by inking, wiping and polishing through stencils, my improved art or method contemplates a substantially simultaneous inking of the entire plate in colors differing in different portions of the plate, and the wiping and polishing of the surface of the plate to insure a clean imprint, the ink from the non-printing or top surface of the plate being removed in large measure prior to the wiping and polishing operations, thus permitting the substantially simultaneous application to the plate of inks of different colors, and avoiding the mixing of the colors during the wiping and polishing operation.

Where the different portions of the design appearing on the plate are not in exact register, or in other words, where there is a substantial area of non-printing surface between those portions of the design inked in different colors, the outline of each such portion of the imprint from the plate will be clear and sharp, and the color tone will be uniform. But where there is an exact register of different portions of the design in different colors, there is a tendency toward an admixture of the colors along the line of demarcation between these different portions, but this would have the effect of causing one color to blend into the other at this point only, and as this blending would in succeeding operations be substantially uniform, it would be non-objectionable, in certain classes of work.

To insure accuracy in the inking of the plate with each color, I apply ink of different colors to the printing plate in a manner

which will limit the application of ink of a color to that area containing the engraved or intaglio lines defining the particular portion of the design to appear in that color, thus avoiding the admixture of ink upon the inking rollers, and permitting the successive applications of inks of different colors.

In order to secure the highest efficiency in the practice of my art or method, I prefer to remove the surface ink from the plate by transferring it to a sequence or plurality of similar ink receiving or transfer surfaces, each such surface being cleaned after each application thereof to the plate.

The invention consists primarily in an art or method of multi-color printing from intaglio or undersurface printing plates, embodying therein the application of inks of different colors to different portions of a plate, the transfer of ink contained upon the non-printing or top surface, and the wiping of the plate; and in such other novel steps and practices as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

In the accompanying drawings, I have illustrated diagrammatically, the manner of practising my improved method or art.

In the drawings

Figure 1 is a plan view of a machine by which my method or art may be practised, and

Fig. 2 is an elevation thereof showing the inking and transfer device and the D roll.

Like letters refer to like parts in both of said views.

In the practice of my invention, I employ an intaglio or undersurface printing plate, bearing thereon in depressed lines, the complete design to be printed in a plurality of colors.

In the accompanying drawings, I have shown a plurality of such plates, a a' a^2 and a^3, in position upon a machine adapted for use in the practice of my art or method. In inking the plate, I employ a plurality of inking rollers b b' and b^2, which rollers are adapted to have impressed thereon as by the ordinary cameo or planographic plate printing process, a design in a color corresponding in location and area to that portion of the printed design to appear in that particular color.

In the drawings I have shown cameo ink transfer rollers c c' and c^2, pairs of distributing rollers d d' and d^2 for applying ink thereto, and the doctors or doctor rollers e e' and e^2 taking their ink from ordinary ink founts f f' and f^2.

The inking rollers b b' and b^2 have a resilient surface as in offset printing work, thus being adapted to receive the ink impression from the transfer rollers c, c', c^2, respectively, and apply this design in ink to the plates a to a^3, in a manner to cause the ink to be forced into the lines of each plate embraced within the area or areas to appear in that particular color.

When ink of one color has been thus applied, as by the inking roller b, ink of another color, representing other portions of the design may be applied by the inking roller b', and ink of a third color may be applied by the inking roller b^2. Inks of any number of colors may be thus applied to the plate, the designs upon the various inking rollers, in the aggregate, representing the entire design to be printed from the printing plate, while the design upon each individual inking roller will coincide with only a part of the plate.

The fact that the ink used in printing will be that secreted in the depressed lines of the plate, makes it practically impossible to apply ink only to those parts from which the impression is to be subsequently made. Hence, while the printing surfaces of the printing plates themselves will be composed of a plurality of distinct lines, the design upon the inking rollers will be a flat continuous design, the outline of which only will coincide with the portion of the design to be printed in that color.

This condition results in the depositing by the inking rollers of ink upon the top or non-printing surfaces, which must be removed prior to the making of the imprint from the plate.

In the art of undersurface printing this ink is removed by means of wiping cloths, but where inks of two or more colors are used, it is apparent that if the ordinary wiping cloths were used, the inks would be mixed upon the top surface and packed into the lines in a manner to destroy the color effects of the imprint.

To avoid the admixture of inks of different colors, I remove these surface inks by transferring them to an ink receiving or transfer surface, the application of this surface to the plate being in a manner to avoid any such rubbing contact as would result in a mixing of the inks in the manner above referred to. This transfer of the surface inks will be accompanied by a packing of the lines of the plate as an incident thereto.

By employing a roller g made of the ordinary composition commonly used in inking rollers and passing a plate under and in contact with this roller while it is being rotated at a peripheral velocity equaling the lineal velocity of the plate, the surface ink may be readily removed without affecting the ink in the depressed lines of the plate. In conjunction with such a roller, I use a second or ink receiving roller g', which may be of the same composition as the roller g, or preferably, of metal, to which the removed ink is applied by the roller g, thus

cleaning the surface of the roller g after each application thereof to a printing plate.

To prevent accumulation of ink upon the roller g', I continually clean this roller as by means of a scraper and wiper g^2 g^3.

Inasmuch as a single transfer operation might fail to remove a sufficient quantity of the surface ink, I preferably subject the plate to a plurality of such transfer operations, in order to secure higher efficiency in the cleaning of the top surface so that if any ink remains upon said surface it will not be in sufficient quantity to cause the wiping cloths which are used after the removal of the surface ink by the ink receiving or transfer rollers, to fix the inks in the manner above referred to.

In the accompanying drawings, I have illustrated a second set of devices for the removal of the surface ink from the plate, the composition roller being shown at h, the ink receiving roller at h' and the scraper and wiper at h^2 and h^3 respectively.

After the removal of the surface ink from the plate in the manner above referred to, I subject the plate to the ordinary wiping and polishing operations, the wiper in the accompanying drawings being illustrated at i and the polisher at j.

Thereafter, an impression is made from the plate in the ordinary manner, as by means of a D-roll k. While in the accompanying drawings, I have shown a plurality of plates, a to a^3, these plates all contain the same design and are acted upon in the same manner as heretofore referred to, consecutively, a complete multi-color imprint being made from each plate.

By exerting only a slight pressure upon the plate by the rollers g h, any tendency to remove ink from the intaglio lines will be minimized, although even the slightest pressure will have a tendency to pack the ink in the depressed lines. The wiping and polishing process will have the same effect in packing the lines of the plate as is characterized by the present wiping and polishing cloths, with the exception that the wiping cloths will not have the surface ink to remove as in the ordinary undersurface printing method. In fact, the wiping operation by my art or method, amounts to little more than a rough polish preparatory to the final polish by the polishing cloths.

The accompanying drawings are merely for the purpose of illustrating my improved art or method, it being understood that this method or art is distinct from the mechanism shown in the accompanying drawings, and may be practised with the aid of any desired mechanism or appliances.

Having described my invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. An art or method of multi-color printing from intaglio or undersurface printing plates, embodying therein the application of inks of different colors to the lines and the adjacent non-printing surface of different portions of a design upon a plate, the transfer or off-setting of ink contained upon the non-printing or top surface of the plate upon a surface stationary with relation to the plate, the wiping of said top surface and making an impression after the plate has been wiped.

2. An art or method of multi-color printing from intaglio or undersurface printing plates, embodying therein the successive application of inks of different colors to the lines and the adjacent non-printing surface of different portions of a design upon a plate, the transfer or off-setting of the ink contained upon the non-printing or top surface upon a surface stationary with relation to the plate after the plate has been inked in its entirety, the subsequent wiping of the plate and making an impression after the plate has been inked.

In witness whereof, I have hereunto affixed my signature, in the presence of two subscribing witnesses, this 24th day of November, 1913.

AMOS H. SMITH.

Witnesses:
F. T. WENTWORTH,
EUGENE WENING.