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A. IRVINE

1,967,057

ART OF PRINTING SENSITIZED SURFACES

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Fig. 1.

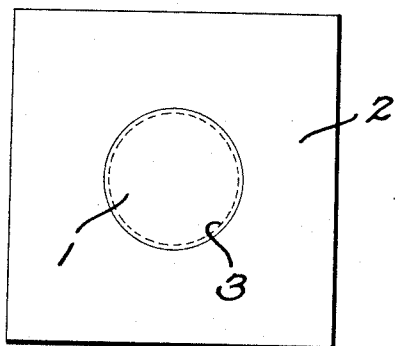


Fig. 2.

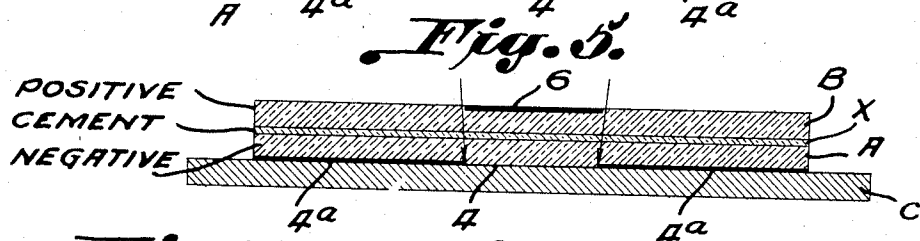
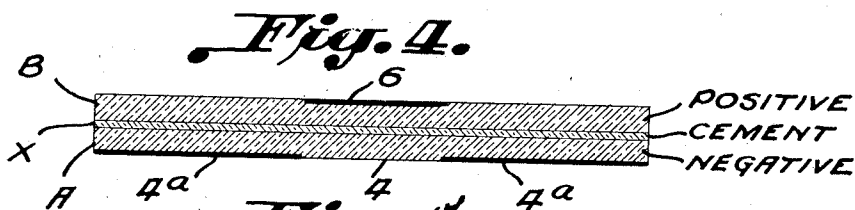
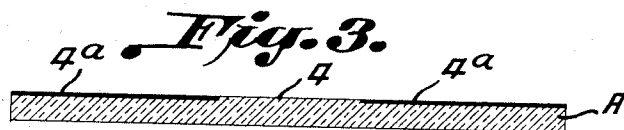
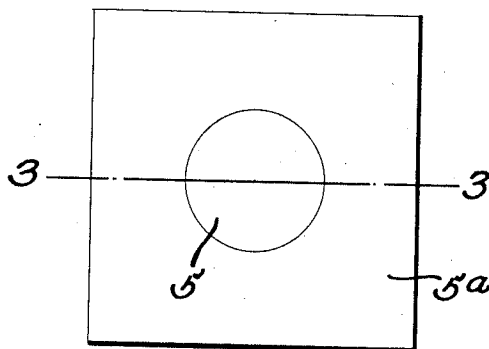


Fig. 7.

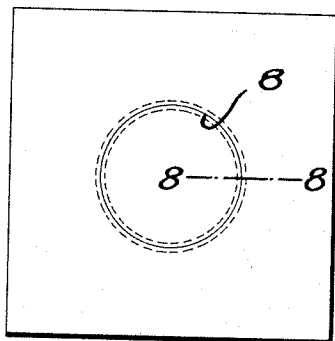


Fig. 6.

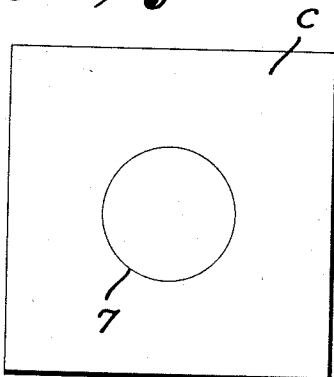


Fig. 9.

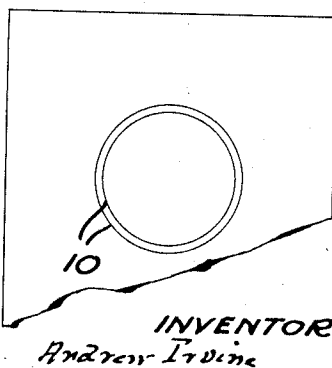
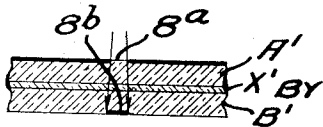


Fig. 8.



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ART OF PRINTING SENSITIZED SURFACES

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3 Claims. (Cl. 95—5)

When printing surfaces are to be formed so that they will be adapted to print a given pluri-colored design what is known as "allowance" has to be provided for, that is, the actual color-depositing portions of the respective surfaces have to be formed so that, given proper registry with respect to each other, the impress effected by any one printing surface will be spaced somewhat from an adjoining impress effected by another printing surface in order that the colors will not run together or "flush" on the fabric or other surface printed. Heretofore it has required a great expense of time and the exercise of careful and tedious manual effort to obtain this allowance in reproducing the differently colored elements of a given design on printing surfaces which are together to reproduce such design; thus the practice is by the use of a stereopticon to throw the design, enlarged, on the whited surface of a zinc plate, then pencil outline the design on this surface with respect to each element thereof, then engrave and thus groove along the pencil outline, then with a traverse-point (or engraving tool having two spaced engraving points) engrave or groove with one point of this tool and inward of the first groove while the other point travels in and is thus guided by this groove, and finally with the use of a pantograph machine cooperating with the second groove, and reducing each element in area and thus giving the allowance, reproduce the outline of the element on the respective printing surfaces in substantially the dimensions of the original design.

By my method herein set forth I can obtain this allowance in a more simple and cheap way and at the same time preserve absolute parallel conformity to the outline in the original design. If, merely by way of example, it is a spot of one color in a field of another the allowance may be taken from either the spot or the field; or it may be taken from both.

In the annexed drawing,

Fig. 1 shows a design consisting of a spot of one color in a field of another, which design is to be reproduced, for example, on two printing surfaces, the spot on one and the field on another, with allowance between the elements of the printed product;

Fig. 2 shows a tracing or other reproduction which has been made on a transparent sheet—in this case of the spot;

Fig. 3 shows a transparent film on which by any photographic process, as by sensitizing a film and then contact printing from the tracing thereon, the spot has been reproduced in its exact shape and size, the film being in section on a line corresponding to 3—3 in Fig. 2;

Fig. 4 shows this film and another sensitized transparent film affixed thereto, as by cementing,

and on which the image of the first film has been reproduced, the two united films forming what I term a composite film-sheet;

Fig. 5 shows this film-sheet positioned to print on a sensitized print-sheet, resulting in an outline which, while conforming to the outline of the spot, is different in diameter—in this example less;

Fig. 6 shows this print-sheet in plan;

Figs. 7 to 9 illustrate a modification of the method in which

Fig. 7 is a tracing on a transparent sheet of the outline (exact size) of the spot of Fig. 1;

Fig. 8 shows a sensitized film printed from the tracing of Fig. 7 (after the manner of Fig. 3) and another sensitized transparent film affixed thereto and having the image of the first film reproduced thereon (thus forming a composite film-sheet), the film being in section on a line corresponding to 8—8 of Fig. 7; and

Fig. 9 shows in plan a sensitized print-sheet which has been printed by the composite film-sheet of Fig. 8, in this example having been placed under said film-sheet as it appears in that figure.

All the sectional views are greatly exaggerated as to thickness of the parts shown.

Referring, first, to Figs. 1 to 7:

Assume the allowance to be had between the spot 1 in Fig. 1 and the field 2 is to be taken from the spot, so that in the product (Fig. 6) the spot is to have a smaller diameter, or as at the dotted line 3 in Fig. 1.

This spot is reproduced at exact size on a film A at 4 (Fig. 3), as by first making a tracing on a transparent sheet 5a (Fig. 2) and then, having a transparent sensitized film, printing by exposure to light through sheet 5a the tracing on such film, which becomes said film A. Film A has then cemented to it, as by a transparent cement, say shellac X, the second sensitized transparent film B, whereupon an exposure to light is effected through film A so that spot 4 of film A is reproduced as a negative on film B at 6, thus forming the mentioned composite film-sheet shown in Fig. 4.

C is a sensitized print-sheet. In the present example the object is to reduce the spot 1, or take the allowance therefrom. Therefore the composite film-sheet is placed on the print-sheet C so that film B is up (Fig. 5) and an exposure is effected through the composite film-sheet, thus reproducing the spot 1 of Fig. 1 in less diameter and as a mere line at 7 in Fig. 6. This is the result of the light, which is directly obstructed by the opaque portions 4a of film A and indirectly (or with a converging shadow effect) by the spot 6 of film B, nevertheless reaching the print-sheet C as shown by the arrows in Fig. 5. I find that the line 7 so produced is exceedingly sharp

and well defined, especially if the films are thin, or of about the thickness of the ordinary photographic films or of that of the Bristol board required for U. S. Patent Office drawings; in short, if there is a thickness of film between the two images (to wit, said opaque portion 4a of film A and spot 6 of film B) which is not more than approximately twice the thickness nor less than approximately a single thickness of Patent Office Bristol board.

Having provided for the allowance, the figure represented by Fig. 6 and the field at 2 (or it may be an adjoining figure or figure-element) may be transferred to the respective printing rollers or other surfaces in any way known in the art of preparing such surfaces.

It may be desired to take the allowance from the field 2, in which case when the print-sheet is printed with the aid of the composite film-sheet the latter would be inverted from its position in Fig. 5, obviously resulting in a line-outline of the field which would be larger in diameter than the spot, the unobstructed light then diverging according to the arrows in Fig. 5 but in the direction opposite to that in which they point.

Referring, now, to Figs. 7 to 9: In this case the allowance may be taken from both the spot, or other figure, and the field, or other figure, or as indicated by the dotted lines in Fig. 7. Fig. 8 shows a fragment of a composite film-sheet on line 8—8 of Fig. 7 (comprising films A' and B' and transparent cement X') prepared substantially as already described from the outline tracing (Fig. 7) of the design, the view being greatly magnified so that the solid line at 8 in Fig. 7 appears to have appreciable width, as at 8a and 8b in Fig. 8. If a sensitized print-sheet as 9 is exposed to light through this film-sheet substantially as in Fig. 5, a double-line outline 10 (Fig. 9) will be printed on the print-sheet as per the arrows in Fig. 8, thus taking the allowance from both figures of the design. In this example the film A' is up, resulting in a wider spacing of the two lines of the double-line outline than if it were inverted, as in Fig. 5.

Thus, given the two adjoining objects, as the spot and field in Fig. 1, I can obtain the allowance by taking from the marginal portion of either which joins the other, i. e., from the spot, by utilizing the composite film-sheet as in Fig. 5, or from the field, by inverting the film-sheet; or I can obtain the allowance from both in the way explained, the allowance in this instance being more or less according as on printing the print-sheet the composite film-sheet is used as in Fig. 8 or inverted, respectively.

The allowance required, as is well known, is usually only a very small part of an inch, frequently approaching the infinitesimal. Therefore one indispensable feature of my invention is that the two films should be in that relation as to register when the print-sheet is printed which is as absolute as their registry when the second film (as B) is exposed through the first (as A), for which purpose it is best that they be affixed immovably together before the second film is so exposed and remain so until the print-sheet is exposed.

The invention in its essentials is obviously not limited to the taking of allowance with respect to the areas of two printing surfaces which are to print in juxtaposition to each other but may be utilized in any case where it is required to reproduce the object of a given picture (as the object of what I term the "picture" here afforded by the

object 1 and field 2 of Fig. 1 or that of the "picture" here afforded by the object 8 and its field in Fig. 7) only as to its outline and sharply, wherefore, so long as there is placed upon a sensitized surface one face of a transparent sheet-like body (as B—X—A or A'—X'—B') having areas respectively containing in registry with each other a positive and a negative of said picture (as the under and top areas, respectively, of such body in Fig. 8, or the top and under areas, respectively, of such body in Fig. 4) and having one of said areas substantially coinciding with said face and the other in a plane parallel with and spaced from said face and distanced therefrom not more than approximately twice the thickness nor less than approximately a single thickness of Patent Office Bristol board, and then the sensitized surface is exposed to light through the portion of said body having such areas, my invention will be performed.

By the term "film" I do not mean to exclude glass or other transparent sheet material.

Having thus fully described my invention what I claim is:

1. The method of producing on a sensitized surface a sharp outline reproduction of a given picture which consists in placing upon said surface one face of a transparent sheet-like body having areas respectively containing in registry with each other a positive and a negative of said picture and having one of said areas substantially coinciding with said face and the other in a plane parallel with and spaced from said face and distanced therefrom not more than approximately twice the thickness nor less than approximately a single thickness of Patent Office Bristol board, and then exposing said surface to light through the portion of said body having such areas.

2. In the preparation of two printing surfaces adapted to print different areas in juxtaposition to each other, the method of taking allowance with respect to a printing area of one such surface which consists in providing a transparent sheet-like body with a positive and a negative of the object to be printed by said area which register and are spaced from and parallel with each other and one of which substantially coincides with one face of said body and the other is distanced from said face not more than approximately twice the thickness nor less than approximately a single thickness of Patent Office Bristol board, then placing said body upon a sensitized surface with its first-named face next to said surface, then exposing said sensitized surface to light through the portion of said body having said positive and negative, and finally transferring the image produced on said sensitized surface to said printing surface.

3. The method of producing on a sensitized surface, a sharp outline reproduction of a given picture, which consists in photographically producing an image of the picture on the sensitized surface of a transparent film, affixing to such film another transparent film having a sensitized surface separated from said surface of the first film not more than approximately twice the thickness nor less than approximately a single thickness of Patent Office Bristol board and while said films are so affixed together producing a negative image of the first image by exposing the sensitized surface of the second film to light through the first film, and finally, while said films remain so affixed together, exposing a sensitized surface arranged in approximate contact with one of said images to light through the films.

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