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R. DEWBERRY

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TYPE INTAGLIO ENGRAVING PLATES AND METHOD FOR THEIR PRODUCTION

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Fig. 1

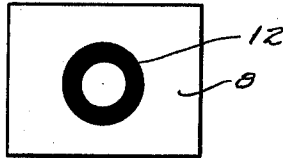


Fig. 2

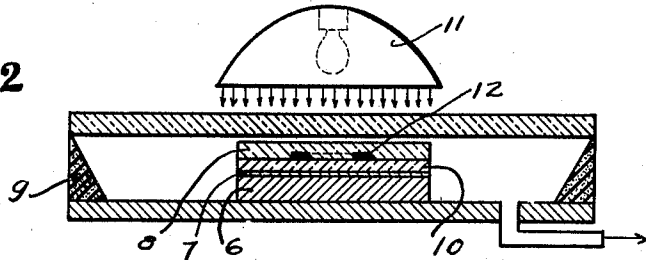


Fig. 3

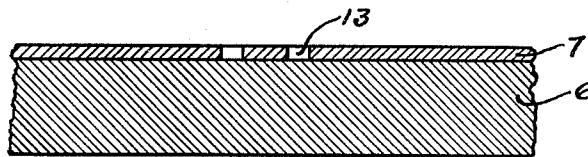


Fig. 4

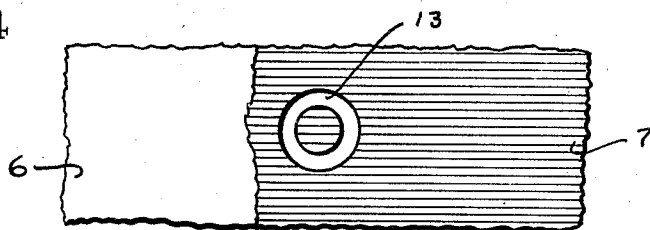
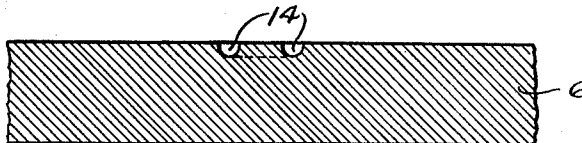


Fig. 5



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TYPE INTAGLIO ENGRAVING PLATES AND
METHOD FOR THEIR PRODUCTION

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2 Claims. (Cl. 95—5.7)

My invention relates to a new and improved method for the production of etched intaglio engraving plates without the use of a screen, camera or pantagraph machine.

Several methods have been in use for producing engraving plates. In one, the original hand method is used for tooling the plate, to which method the only objection is the skilled labor cost. In an effort to reduce the latter cost item, another method was devised in which the surface of a metal plate was covered with an acid-resistant coating which was then scratched off by the use of master plates and a pantagraph machine employing a diamond point and the engraving plate thus scratched was etched to the proper depth and the coating washed off, after which to finish it, it was necessary to tool it by hand by reason of the fact that the hair lines produced by the diamond point would not permit lines or marks exceeding the hair line in width to be satisfactorily produced by an etching step. While this represented an appreciable reduction in labor cost over the hand tooled method, it still left the production of engraving plates an expensive process requiring much highly skilled labor.

While photo-engraving and rotogravures belong more particularly to the printing, than to the engraving, art, in their development it was found by the use of half tone or rotogravure screens having about 150 lines per inch, a print could be made through the screen on the light-sensitive, acid-resistant film on a metal plate. It was customary photographically to produce a dot formation through the screen on such a film and the plate was then washed and etched. In the case of the photo-engraving plate, what are sometimes termed wells were etched therein and due to skilled control of light these wells have an approximately constant depth but vary in size. Such etched plates are suitable for printing but are unsuited for engraving. In the case of the rotogravure plates, the etching produced dots constant in size defined by wells or cavities varying in depth. While such processes are well adapted for the reproduction of images and scenes by printing, where variation in tone was desired, it is well recognized that they were entirely unsuited for letter or line engraving, not only because engraving involves an entirely different method of reproduction, but also because the multiple well method is incapable of producing the clearness of outline required for lettering or lines in an engraving plate, and it has heretofore been recognized that, for engraving

purposes, lettering and line work must be hand cut or hand finished to produce the requisite clearness of outline and uniformity of depth in the resulting ink well so that there would be no variation in the letters or blurring of the lines produced from the plate.

By my present invention I propose to produce plates suitable for the engraving of letters, lines and designs by a new and simplified method in which I eliminate entirely the use of any photographic step with a camera, I dispense with the use of any screen, and I eliminate all of the sensitive and delicate adjustments and controls of the processes which are dependent upon highly skilled labor so that with a relatively negligible labor cost, which need not be highly skilled, I am enabled to produce directly from a printed subject an intaglio plate having etched therein ink wells, each conforming accurately to the design or outline of a type produced letter, symbol or design, and all having a constant depth and clearness of outline approximating hand tooled work.

In the accompanying drawing I have sought to illustrate the preferred method for the practice of my process in so far as it is susceptible of illustration.

According to the drawing:—

Fig. 1 illustrates in plan view a transparent sheet having printed thereon from suitable type the letter O which has been dusted with suitable material to render it more opaque and clearer of outline.

Fig. 2 is a vertical cross sectional view through a vacuum printing frame showing the coated plate having applied thereon the printed sheet shown in Fig. 1 with an interposed transparent sheet, all held tightly assembled by suction, with a source of light shown to print the letter on the sensitized film of the coated plate, which film and the sheets are shown greatly exaggerated in thickness as compared with the plate.

Fig. 3 is a cross sectional view taken through the plate after that portion of its film, which has been protected from the light rays, has been washed away, and here again the film with the print formed therein is shown in greatly exaggerated thickness as compared with the plate.

Fig. 4 is a plan view of Fig. 3 with the glue coat broken away.

Fig. 5 is a cross sectional view taken diametrically through the ink well etched in the plate, the glue coat having been removed.

In the drawing, similar references refer to similar parts.

In the preferred practice of my process, I proceed as follows. A flat plate 6 of copper, brass, zinc, steel or other suitable material is coated on one side with a light-sensitive acid-resistant film 7 of bichromated glue or the like which is applied in a manner to produce a very thin film of uniform consistency over the entire plate. This type of film may be obtained by applying the glue along one or more edges of the plate and letting it advance across the plate so as to displace ahead of it any moisture on the washed surface of the plate, after which the plate is spun over heat so as to insure an even deposit of the glue film and to cause it to dry. Since the glue film increases in light-sensitiveness as it dries, the spinning and drying process must be conducted with light practically excluded. The requisite light-sensitiveness characteristic of the film can be controlled by the thickness of the film and the amount of its ammonium bichromate content. The standard mix for the glue, according to the character of work, having been determined, it does not require variation as a general rule. This glue is a commercially available article and need not therefore be further described in detail.

The letter, line or symbol subject matter to be reproduced by my engraving process is then printed from type or plates on any suitable transparent material such as a sheet 8 of glassine paper, cellophane, tracing paper, or the like and while the ink is still wet the sheet is at once dusted with an opaque powder such as lamp black, which will adhere to the ink and therefore will produce a more opaque letter with a sharp outline which is of critical importance, in that it can be so reproduced by the etching step as to eliminate any hand tooling and finishing of the plate.

The plate 6, coated as above described, is thereupon placed in a vacuum printing frame 9, as shown in Fig. 2, with its coated side up and a sheet 10 of transparent paper, such as cellophane, is laid over the coated side of the plate and the printed and dusted sheet 8 is thereupon inverted and laid face down upon this interposed transparent sheet and both sheets are thereupon pressed firmly into contact with the coated plate by exhausting air from the frame. The sheet 10 prevents the dusted letter or symbol smearing the glue film 7 on the plate and has also an additional function later referred to.

The exposure time varies from three to five minutes depending on the subject matter and the light-sensitiveness of the glue. The plate is kept sufficiently cool during this exposure step to prevent the overheating of the glue. The chemical reaction taking place between the light and that portion of the light-sensitive film 7 on the plate will cause such film to harden all over the plate except where the light rays are intercepted and excluded from contact with the film by the densely opaque printed subject matter 12, such as the letter O shown which is typical of a letter, symbol or line design.

After this light treatment, the plate is removed from the vacuum frame and washed under a stream of water to remove the glue that has not been reacted upon by the light, and in this manner a print 13 (Fig. 3) is produced in the glue film 7 having as clear cut an outline as that of the original printed letter 12 to be reproduced. The interposed sheet 10 acts to cause the light rays passing the edges of the letter 12 to tend to converge inwardly in their traverse of sheet 10, thereby slightly reducing the image defined on the glue coat 7.

This drawing down of the image outline tends to decrease its size sufficiently to overcome the action of the etching acid in the final step of preparation of the plate to the extent that the print 13 of letter, line, etc., as defined in the glue film, will be brought out in the final plate in almost the exact dimensions of the printed impression 12 to be reproduced. The washed plate may be tested for clarity of print outline before the plate is burnt-in by immersion in a solution of Gentian violet dye which brings out the outline of the print 13 clearly. Should the print appear defective to such an extent that it is impractical to use the plate, the glue film can be washed off and the same plate again used, and in this way I obtain a marked economy in my process both in material and in labor, since the plate can be brought to this condition very rapidly and at but slight cost before being checked.

Assuming that the print 13 appears suitable for use on the plate, the film 7 is then burned-in by being held over a gas burner or like source of heat until the glue hardens. This step is conducted slowly and with care to avoid overheating the glue in spots, causing it to crack and adversely affecting its acid-resistance. The plate thus prepared and burnt-in is shown in Fig. 4 and it is now ready for final inspection. Any defects appearing are painted over with a suitable asphaltic paint of an acid-resistant character, and the plate is then subjected to the etching bath consisting of a suitable acid according to the material in the plate. The plate is etched face down in the acid to form therein an ink well 14 having a contour corresponding to a hand tooled groove or cut that would be required for a similar impression in a hand tooled plate.

In my method no interruption of the etching process is needed because the amount of undercutting on the part of the acid becomes negligible in view of the size of the wells 14, each of which will, as stated, correspond in dimensional area with the printed letter, symbol or design 12 which it is to reproduce as contrasted with multiplicity of wells which in the rotogravure process would be required to reproduce the letter 12 and which would be separated by very fine walls throughout the reproduction corresponding to 14 on the plate.

Having completed the etching of the plate 6 in one step, it is removed from the acid bath, washed and the glue coat is removed with benzol, gasoline or like solvent and the plate, as shown in Fig. 5, is ready for use in engraving without, as a general rule, having to be hand tooled or finished.

My present process is especially adapted to the mechanical production of plates for card and letter head engraving where it is a matter of prime importance to produce a clear, clean, raised reproduction from type-printed control sheets 8 with the embossed letters conforming accurately to type-printed proofs and to reduce cost and time required for plate production to such an extent.

My present invention includes both the novel process and the engraving plate produced thereby, and contemplates such modifications as may reasonably come within the scope of the appended claims.

What I claim is:—

1. The herein described process for the production of intaglio engraving plates from impressions printed on a transparent sheet and treated with material to blacken and more clearly define such impressions, which consists in inverting the printed sheet, interposing a second plain transparent sheet between the printed surface of said

first transparent sheet and the light sensitive, acid resistant film coat on an engraving plate, holding the sheets against said plate, and printing the impressions on said coat, then washing, burning and etching the printed plate.

5 2. The herein described process for the production of intaglio engraving plates from impressions printed on a transparent sheet and treated with material to blacken and more clearly define such impressions, which consists in in-
10 verting the printed sheet, interposing a second

plain transparent sheet between the printed surface of said first transparent sheet and the light sensitive, acid resistant film coat on an engraving plate, holding the sheets against said plate, and printing the impressions on said coat in some-
5 what reduced finer lines than appear in the impression, then washing, burning and etching the printed plate to produce therein wells defining lines substantially conforming in size to the original lines of the impression.

RALPH DEWBERRY. 10