

Jan. 13, 1931.

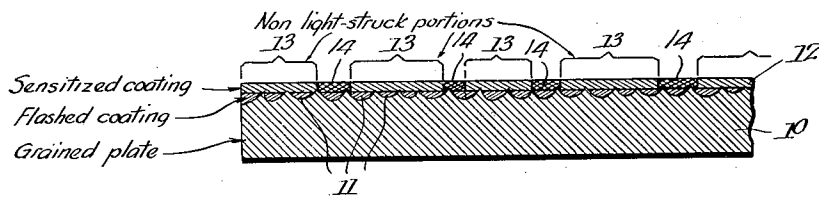
R. A. GLASER

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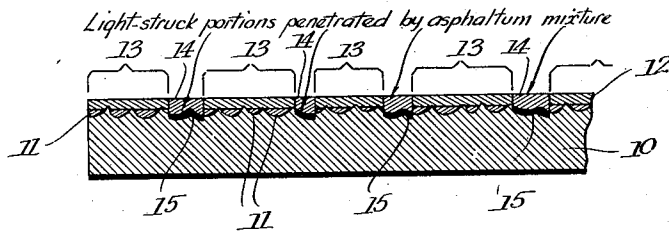
PRINTING PLATE AND PROCESS OF MAKING SAME

Filed July 25, 1928

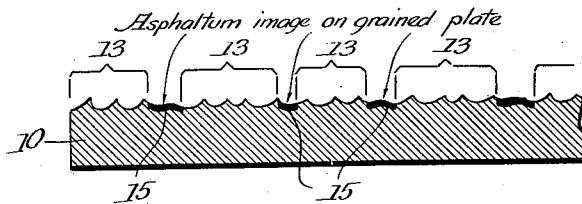
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Inventor

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## UNITED STATES PATENT OFFICE

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GARDNER ABBOTT, AS TRUSTEE

## PRINTING PLATE AND PROCESS OF MAKING SAME

Application filed July 25, 1928. Serial No. 295,266.

A part of the subject matter hereof is disclosed in my copending application Serial No. 180,590.

This invention relates to printing plates and photomechanical processes of making them and aims generally to improve such plates and processes. Although the invention is particularly advantageous as applied to large size plates for offset or direct lithographic printing and is applicable for pictorial color work in any number of desired colors, it is to be understood that printing plates and processes embodying the invention are applicable to other types of printing and reproduction.

The invention aims to secure the sharp detail and truthful representation of the colors and tones of the original copy when applied to one color or multi-color printing, and to improve the brilliancy and tone values of the printed copies as compared with those made by existing commercial processes and plates; to shorten the time and to reduce the cost heretofore required to make a set of color printing plates; and to produce a durable printing surface that will give a large number of impressions before losing its sharp detail, and that may be readily restored for further printing by mechanical means.

Other objects and advantages of the invention will appear in connection with the following description of an illustrative plate and mode of making it intended for use in printing posters.

For purposes of illustration, the invention will be described as applied to an intaglio-planographic printing plate adapted for use in offset lithographic printing, although it is understood that the invention is applicable to printing by direct lithographic printing, photogravure, rotogravure, rotary photogravure and other processes.

The intaglio-planographic type of plate referred to herein is characterized by having the ink receiving surface defined by a greasy condition that inheres in the grain of the metal and neither flows nor spreads, and that is so intimately connected to the metal as not to be removable therefrom by washing or scrubbing, as distinguished from plano-

graphic plates having the image affixed to the surface of the plate by a transfer process or developed upon or in a coating applied to the surface of the plate.

In the drawings, Figs. 1, 2 and 3 indicate diagrammatically the successive steps taken in the development of the image and treatment of the plate to form a permanent printing surface.

According to the illustrated form of the invention a suitable sheet 10, as for instance, a metal plate of zinc, aluminum or other suitable metal or alloy, is lightly grained on its printing side to improve its affinity for water but not sufficiently to form a printing pattern, and is given a very thin coating 11 of light sensitive material, such as bichromated gelatine or albumen, which is dried by whirling or otherwise.

The coating 11 is exposed to light for a short interval to fix it, whereupon it is wetted and coated again preferably with sensitized albumen, the second coating 12 being spread uniformly thin throughout and dried by whirling or otherwise.

The coated plate is then ready to be exposed to actinic light rays passed through a transparent image and a so-called "lithographic" screen in a suitable apparatus, as, for example, that described in Pifer Patent No. 1,347,824, dated July 27, 1920, for photographic apparatus, wherein the metal plate may be supported in the holder in place of the sensitized transfer sheet therein described. If a screen produced negative, such as a half tone negative for example, be used for the transparent image, a lithographic screen is not necessary. Other types of apparatus may be employed, as the invention contemplates projecting or photographing the image to the coated plate by actinic light rays, in any suitable manner.

The source of the light rays is preferably a carbon arc lamp so constructed that the positive carbon is disposed in axial alignment with the direction of the projected rays, and is caused to revolve constantly so as to maintain a crater at its point which holds a small volume of incandescent gas or vaporized metals produced by the arc.

The coated plate will be affected where struck by suitable light rays penetrating the coating as is indicated in Fig. 1, where the non-light-struck portions 13 and light-struck portions 14 are clearly indicated. The intensity and character of the light rays have an important bearing on the speed of the exposure and the character of the printing plate produced, and I have discovered that a rotating carbon lamp produces the most satisfactory results. Whether this is due to peculiar properties of the projected ray or to increased intensity of the ray is not known to me.

Instead of first washing away the non-light-struck portions of the coating and developing the light-struck portions to form the printing image, as has been the usual practice heretofore, the exposed plates are flowed with a developing and penetrating composition containing a water repelling substance, preferably an asphaltum mixture containing a greasy ink if the plate is to be used in lithographic printing, which composition is spread evenly and allowed to dry. The particular ingredients and proportions of each in the composition may be determined by experience to suit the nature of the plate, but should be sufficiently fluid to flow readily. A composition suitable for the purpose is as follows:

|                                 | Ounces |
|---------------------------------|--------|
| Lithographic transfer ink ----- | 5      |
| Lavender oil -----              | 4      |
| Asphaltum -----                 | 12     |
| Benzol -----                    | 12     |
| Turpentine -----                | 6      |

To which may be added six ounces of benzine.

The effect of the asphaltum mixture on the light-struck portions 14 of the coating 12 and the coating 11 is to sink through and change its character where there are printing dots in the image, leaving the non-light-struck portions 13 unaffected to form the water dots on the plate which do not take ink, as indicated in Fig. 2, where patches of asphaltum mixture 15 are deposited upon the metal except where the latter is protected by the non-light-struck portions 13. The asphaltum mixture adheres to the metal and penetrates or is embedded beneath or in its surface, forming a sunken image composed of dots when a lithographic grain screen or screen produced image is used. The chemical action, if any, of the asphaltum mixture upon the surface of the metal plate is not clearly understood at this time, but it seems to have an effect upon the metal, changing its character, giving it a selective affinity for lithographic ink, so as to fix the image therein, as it has been found possible to recover the printing image after it has apparently been completely lost without resorting to re-exposure to the master-copy.

As soon as the plate is sufficiently dry after flowing it with the asphaltum mixture, it is developed in warm water with the aid of cotton, whereupon the light sensitive coatings 11 and 12 are entirely washed away leaving the grayish sunken image formed by the asphaltum mixture, as shown in Fig. 3. The plate is then powdered with soapstone and cleaned with tannic acid and resin, or other suitable cleaning compositions, following which it may be treated again with asphaltum mixed with benzol, or asphaltum varnish, to strengthen the image, and any touching up needed may be given to it in any manner known in the lithographic art before rolling it up to make it ready for the press in the usual way. Both lithographic and deep etched plates may be produced in this manner for offset and dry printing.

The effect of the printing is much like that produced from intaglio plates, that is, the printed image is more brilliant than that produced by ordinary lithographic or planographic plates wherein the ink is carried on the surface produced by transferring an ink image to the plate, because the printing image is printed into the plate with strong actinic rays of light, giving a sharp clean image which takes a thick body of ink for transfer to the print.

Printing plates made according to my invention are entirely suitable for multi-color work, and faithfully reproduce all of the fine tints and tone effects of the original copy. The process of making the plates is very rapid, requiring but a few hours for the completion of a set of plates for printing in five or six colors, and is comparatively inexpensive.

My improved printing plate is capable of producing high grade printing at exceedingly high speed, and is capable of printing a large number of impressions without losing its sharp detail. Furthermore, should the printing image be slightly damaged or accidentally lost through negligence of unskilled workmen, it can be readily restored by coating with asphaltum mixture and treating as before described.

In the claims the terms "lithographic light sensitive coating" and "lithographic light permeable coated surface" include those light sensitive coatings used in lithographic and planographic printing which are disintegrated by the action of intense light or thereby rendered permeable to the asphaltum mixture or equivalent developing ink, and although I have referred specifically to the use of sensitized gelatine or albumen as preferable in the illustrated form of the invention, other known lithographic sensitized coatings having the described properties may be used.

Changes in the process to suit unusual or special subjects, or for the convenience of

individual users, may be readily made by those skilled in the art.

What I claim as my invention is as follows:

1. The process of making lithographic printing plates which consists in photographing an image directly to the plate by the action of high intensity actinic light rays upon a lithographic light permeable coated printing surface thereof to render portions thereof permeable to a developing composition, treating the coated plate with a greasy asphaltum developing composition to form the printing image thereon, which permeates the surface of the plate, and then removing the remaining portions of the coating.

2. The process of making metal printing plates which consists in photographing an image directly to the plate by the action of high intensity actinic light rays upon a lithographic light permeable coated printing surface thereof, flowing the sensitized surface of the plate with an asphaltum base greasy ink solution to permit the solution to penetrate the plate and form a deposit thereon corresponding to the light-struck portions of said surface, thereby forming the printing image, and then removing the remaining portions of the coating material.

3. The process of making lithographic printing plates which consists in projecting an image directly to the plate by the action of high intensity actinic light rays upon a lithographic coated printing surface thereof permeable to such a light, impregnating the light-struck portions of the plate with an asphaltum ink solution to form an ink-receiving image, washing away the light-struck portions of the coating, and cleaning the bare surface of the plate to form a surface capable of taking moisture and resisting ink.

4. The process of making lithographic printing plates which consists in projecting an image by the action of light upon a light permeable lithographic surface coating of a grained printing plate capable of being impregnated by a developing ink, impregnating the light-struck portions of the surface with an asphaltum ink solution to form an ink-receiving image on the plate, washing away the surface coating and then cleaning the bare surface of the plate not covered by the asphaltum image to form a surface capable of taking moisture and resisting ink.

5. The process of making printing plates which consists in coating the plate with a lithographic light sensitive solution normally impermeable by asphaltum greasy ink but permeable to said ink when affected by light of high intensity, photographing the image upon said coating by the action of light of high intensity to penetrate the coating above the printing surface, covering said coating with said ink to fix the ink-receiving image directly upon and penetrating the plate, and

then washing away the coating and ink except that constituting said ink-receiving image.

6. The process of making intaglio-planographic printing plates which consists in projecting an image directly to the plate by the action of actinic light rays of high intensity upon a lithographic light permeable coating covering the printing surface thereof, transfixing the light-struck portions of the sensitized plate with a mixture containing bituminous material to form the printing image penetrating the plate and then removing the remaining portions of the coating.

7. The process of making lithographic printing plates which consists in projecting an image by the action of light upon a lithographic light sensitive coating on the grained plate capable of being impregnated by an ink selective composition, and then changing the character of the surface of the plate in regions underlying the light-struck portions of the plate by means of a solution capable of penetrating the light-struck portions of the coating and sinking into the grain of the plate.

8. The process of making printing plates which consists in coating the grained plate capable of being impregnated by a developing ink with a lithographic light sensitive material normally impermeable by greasy ink but permeable to said ink when affected by light, photographing the image upon said coating by the action of light rays to penetrate the coating above the printing surface, covering said coating with said ink and then washing away the coating and ink except in regions where the ink has penetrated the plate.

9. The process of preparing metallic printing plates which consists in coating a metal plate grained to receive water, with a lithographic albuminous coating soluble in water, transferring an image to said coating by the action of light, penetrating the surface of the plate by a greasy mixture through the light-struck portions of the coating, and washing away the coating to leave the water-receiving surface of the plate surrounding the greasy image.

10. The process of making printing plates which consists in photographically projecting an image directly upon a lithographic light permeable coated surface of a printing plate by the action of high intensity actinic light rays to render the light struck portions permeable to a developer, treating the entire coated surface of the plate with an ink selective developer capable of penetrating the metal plate to develop the printing image firmly ingrained in said plate, and then removing the portions of coating and developer surrounding the image.

11. The process of making printing plates which consists in photographically project-

- ing an image directly upon a lithographic light permeable coated surface of a printing plate by the action of high intensity actinic light rays to render portions thereof permeable to a developer, treating the entire coated surface of the plate with an asphaltum developer having an affinity for greasy ink but repellant to water to develop the printing image firmly ingrained in said plate and then washing away with water the portions of coating and developer surrounding the image.
12. An intaglio-planographic metal printing plate having a lithographic albuminous coating on one face thereof, portions of which are disintegrated by light, and an asphaltum ink composition penetrating said albuminous coating where disintegrated and sinking into and penetrating said metal plate to form a printing image capable of receiving ink.
13. An intaglio-planographic metal printing plate having a finely grained surface and light affected areas corresponding to a photographic image, said areas being covered by hardened non-metallic ink-receiving portions penetrating and firmly ingrained in said metal plate.
14. An intaglio-planographic metal printing plate having a finely grained surface and light affected areas corresponding to a photographic image, said areas being covered by an asphaltum ink receiving material of durable character, thereby providing a printing image having a selective affinity for ink, said light-affected areas being of permanent character so that the printing image, if removed, may be rebuilt according to the original image by retreatment with the asphaltum material.
15. An intaglio-planographic metal printing plate having a finely grained surface and areas permanently affected by light corresponding to a photographic image, said light affected areas being impregnated by hardened material of permanent character having a selective affinity for ink.
16. A photographic printing plate penetrable by an ink-selective composition, and having a grained surface to take water and light-struck areas of permanent character corresponding to a photographic image, said areas being covered by hardened greasy material penetrating the plate.
17. A photographic printing plate penetrable by an asphaltum composition, and having a grained surface to take water and light-struck areas of permanent character corresponding to a photographic image, said areas being covered by hardened asphaltum base material penetrating the plate.
18. A photographic intaglio-planographic metal printing plate having permanent light-struck areas corresponding to a photographic image, said areas being impregnated by ink-receiving portions of hardened asphaltum base material.
19. A photographic intaglio-planographic metal printing plate having permanent light-struck areas corresponding to a photographic image, said areas being impregnated by ink-receiving portions of hardened asphaltum base material sunken therein.
20. A metal intaglio-planographic printing plate having a finely grained surface capable of receiving water and light-struck areas corresponding to a photographic image, said plate, where affected by light, being covered by hardened non-metallic ink-receiving portions impregnated in said metal plate and constituting a printing image sunken therein.
21. A metal intaglio-planographic printing plate having a finely grained surface capable of receiving water and light-struck areas corresponding to a photographic image, said plate, where affected by light, being covered by hardened bituminous ink-receiving portions impregnated in said metal plate and constituting a printing image sunken therein.
- In testimony whereof, I have signed my name to this specification.
- RUDOLPH A. GLASER.