

UNITED STATES PATENT OFFICE.

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PRINTING-PLATE AND PROCESS OF PRODUCING SAME.

951,103.

Specification of Letters Patent.

Patented Mar. 8, 1910.

No Drawing. Application filed April 17, 1905, Serial No. 256,120. Renewed July 22, 1909. Serial No. 509,062.

To all whom it may concern:

Be it known that I, GEORGE R. CORNWALL, a citizen of the United States, residing at Rye, in the county of Westchester and State of New York, have invented new and useful Improvements in Printing-Plates and Processes of Producing the Same, of which the following is a specification.

The invention relates to printing plates and, more particularly, to the class known as planographic plates.

An object of the invention is to provide a printing plate which shall be of comparatively inexpensive and simple manufacture, and which shall possess printing qualities of a high order, and to provide a method for producing such a plate. These and other objects of the invention will more fully appear from the following description.

The invention has in view the production of an all-metal planographic printing plate in which the ink-rejecting part is composed of metal which has passed to the solid from the liquid state, (and which may be allowed to do so without being subjected to any influences tending to change or modify the structure and qualities which it naturally assumes on passing to the solid from the liquid state,) and includes a process for producing such a plate.

The invention consists in the novel processes, steps and articles herein described.

The process has in view the taking of a metal which is of such nature as to act efficiently as the ink-taking element of a planographic printing surface and depositing thereon a metal, while in the liquid or molten state, which is adapted to act as the ink-rejecting element of a planographic printing surface, and the removing of the deposited metal after deposition so as to expose the basic metal in such manner or form so as to define the design, the combined surface constituting a planographic printing surface.

A manner of carrying out the said process is hereinafter set forth.

A material which is adapted to act as the ink-taking element of a planographic surface, such as the metal iron, is taken and is given a regular surface, which said surface may be a plane or may be cylindrical, or have any other desired conformation. The

surface of the said iron base or member is then cleaned from all foreign material and being at a proper temperature is dipped into a liquid or molten metal which is capable of acting as the ink-rejecting element of a planographic surface, such as zinc. The plate may then be removed from the molten metal, when it will carry with it an adherent coating of the same. The plate is then allowed to cool. Thereafter the surface of the plate, which now consists of the said ink-rejecting metal, may be surfaced in a suitable manner, when desirable, as by planing, grinding, graining, or otherwise.

Having the surface in proper condition, the next step consists in transferring the design to the surface of the plate in such form as to protect all parts of the surface excepting the design from the action of a reducing agent, which reducing agent is used for the purpose of removing the surface layer in the portions which are to constitute the design, so as to expose the basic and ink-taking metal in the design-constituting portions. One manner of effecting this is by covering the surface of the plate with a sensitized coating or film, which may be of any suitable material, as chromated albumen, chromated gelatin, sensitive asphalt, or other suitable substance. The design is then transferred to the surface in a suitable manner, as by means of a negative, or in the case of composed printed matter a translucent or transparent paper or other fabric may be used as a carrier for the printed matter and this may be applied to the plate face-to or reversed as may be suitable. The plate is then exposed to the light. After being exposed the plate may be rolled up in ink, or not, as desired, and it is then developed. Where the action of the light has been entirely cut off by the negative or other design-bearing medium, the surface of the plate will be exposed by reason of the entire sensitive coating dissolving away in the process of development. The surface of the plate will thus be left exposed in the design-constituting portions. The surface of the albumen, after this treatment, is rolled up in an acid resistant medium. A reducing agent may then be applied, and will attack the surface where exposed, and will etch it away so as to expose the basic metal. A suitable

solvent, such as turpentine, is now applied to the resistant coating covering the remainder of the surface, dissolving away the said medium, and the hardened albumen
 5 may be removed by a proper solvent, such as potash, thus leaving the plate clean. The surface of the plate now consists of a design in the ink-taking or basic metal while the remainder of the surface consists of the ink-
 10 rejecting metal.

Where it is not desired to use some form of design-bearing surface acting as a negative, other means of securing the proper action of the light upon the surface may be
 15 used. Where characters have been placed upon transfer paper in reverse, that is the ink being applied around instead of on the character, leaving the character outlined in the material of the paper a direct transfer
 20 may be made to the sensitive surface of the plate. In this case the design may be transferred direct to the surface of the plate without the application of a sensitive coating, as the ink from the transfer sheet will cover all
 25 parts of the plate excepting the design part, which is the part it is desired to remove in order to expose the design in the basic metal. The design so placed upon the metal plate may be reinforced by a proper resist such as
 30 a resinous material, and a reducing agent may be then applied in substantially the manner set forth above. After the reducing agent has acted to remove the overlying film of metal so as to expose the basic metal to
 35 form the design, the plate may then be cleaned and will have a surface in which the design is defined in the ink-taking or basic metal, while the remainder of the surface consists of the ink-rejecting metal.

40 The invention, in its broader aspects, is not limited to the particular manner or means for carrying out the invention, nor to any particular manner or means, as changes may be made in these without departing
 45 from the main principles of the invention and without sacrificing its chief advantages.

What I do claim as my invention and desire to secure by Letters Patent, is:—

1. The process of producing a printing
 50 plate which consists in applying to the surface of a metal plate or base a metal in a liquid or molten state so as to form a layer or coating thereon, and then removing said layer or coating from a portion of the sur-
 55 face of said plate or base, so that the surface of said layer or coating and of said plate or base, where it is exposed, may constitute a planographic printing surface.

2. The process of producing a printing
 60 plate which consists in applying to the surface of a metal plate or base a metal in a liquid or molten state so as to form a layer or coating thereon, then protecting a por-
 65 tion of said layer or coating by a resist and then removing the unprotected portions of

said layer or coating, in order that the surface of said layer or coating and that of said plate or base, where it is exposed, may constitute a planographic printing surface.

3. The process of producing a printing
 70 plate which consists in applying to the surface of a metal plate or base a metal in a liquid or molten state so as to form a layer or coating thereon, then protecting a por-
 75 tion of said layer or coating by a resist and then applying a reducing agent so as to remove the unprotected portions of said layer or coating, in order that the surface of said layer or coating and that of said plate
 80 or base, where it is exposed, may constitute a planographic printing surface..

4. The process of producing a printing
 plate which consists in applying to the sur-
 face of a metal plate or base a second metal
 in a liquid or molten state so as to form a
 85 layer or coating thereon, and then removing said coating or layer from a portion of the surface of said plate or base so that the sur-
 face of said layer or coating and of said
 plate or base, where it is exposed, may con-
 90 stitute a planographic printing surface.

5. The process of producing a printing
 plate which consists in applying to the sur-
 face of a metal plate or base a second metal
 in a liquid or molten state so as to form a
 95 layer or coating thereon, then protecting a portion of said layer or coating by a resist and then removing the unprotected portions of said layer or coating, in order that the surface of said layer or coating and that of
 100 said plate or base, where it is exposed, may constitute a planographic printing surface.

6. The process of producing a printing
 plate which consists in applying to the sur-
 face of a metal plate or base a second metal
 in a liquid or molten state so as to form a
 105 layer or coating thereon, then protecting a portion of said layer or coating by a resist and then applying a reducing agent so as to remove the unprotected portions of
 110 said layer or coating, in order that the surface of said layer or coating and that of said plate or base, where it is exposed, may constitute a planographic printing surface.

7. The process of producing a printing
 115 plate which consists in applying to the surface of a metal adapted to act as the ink-taking element of a planographic printing surface a metal in a molten or liquid state, so as to form a layer or coating upon the
 120 said metal, said layer or coating being adapted to act as the ink-rejecting element of a planographic printing surface, and then removing the said layer or coating from that portion of the surface of the said metal
 125 which is to constitute the design.

8. The process of producing a printing
 plate which consists in applying to the sur-
 face of a metal, adapted to act as the ink-
 taking element of a planographic printing
 130

surface, a metal in a molten or liquid state, so as to form a layer or coating upon the said metal, said layer or coating being adapted to act as the ink-rejecting element of a planographic printing surface, applying a resist to the surface of the said layer or coating upon those parts exterior to the design, and then removing the said layer or coating from that portion of the surface of the said metal which is to constitute the design.

9. The process of producing a printing plate which consists in applying to the surface of a metal adapted to act as the ink-taking element of a planographic printing surface a metal in a molten or liquid state, so as to form a layer or coating upon the said metal, said layer or coating being adapted to act as the ink-rejecting element of a planographic printing surface, applying a resist to the surface of the said layer or coating upon those parts exterior to the design, then applying a reducing agent to the exposed portions of said layer or coating so as to remove such exposed portions of said layer or coating, in order that the surface of said layer or coating and that of said plate or base where exposed by the removal of the layer or coating, may constitute a planographic printing surface.

10. The process of producing a printing plate which consists in applying to the surface of a metal adapted to act as the ink-taking element of a planographic printing surface a second metal in a molten or liquid state, so as to form a layer or coating upon the first metal, said layer or coating being adapted to act as the ink-rejecting element of a planographic printing surface, and then removing the said layer or coating of said second metal from that portion of the surface of the first metal which is to constitute the design, so that said layer or coating and the exposed portion of said first metal may constitute a planographic printing surface.

11. The process of producing a printing plate which consists in applying to the surface of a metal adapted to act as the ink-taking element of a planographic printing surface a second metal in a molten or liquid state, so as to form a layer or coating upon the first metal, said layer or coating being adapted to act as the ink-rejecting element of a planographic printing surface, applying a resist to the surface of the second metal upon those parts exterior to the design, and then removing the layer or coating of said second metal from that portion of the surface of the first metal which is to constitute the design.

12. The process of producing a printing plate which consists in applying to the surface of a metal adapted to act as the ink-taking element of a planographic printing surface a second metal in a molten or liquid

state, so as to form a layer or coating upon the first metal, said layer or coating being adapted to act as the ink-rejecting element of a planographic printing surface, applying a resist to the surface of the second metal upon those parts exterior to the design, and then applying a reducing agent so as to remove the unprotected portions of said layer or coating from that portion of the surface of the first metal which is to constitute the design, in order that the surface of the said layer or coating and that of said plate or base may constitute a planographic printing surface.

13. The process of producing a printing plate which consists in immersing a metal adapted to act as an element of a planographic printing surface in a molten or liquid metal adapted to act as the other element of a planographic printing surface, withdrawing said metal with its adherent coating of molten or liquid metal, allowing same to cool and then removing a portion of said layer or coating so as to enable the said elements together to constitute a planographic printing surface.

14. The process of producing a printing plate which consists in immersing a metal adapted to act as an element of a planographic printing surface in a molten or liquid metal adapted to act as the other element of a planographic printing surface, withdrawing said metal with its adherent coating of molten or liquid metal, allowing same to cool, applying a resist to a portion of the surface of the said layer or coating and then removing the said layer or coating, where not covered by the resist, so as to enable the said elements together to constitute a planographic printing surface.

15. The process of producing a printing plate which consists in immersing a metal adapted to act as an element of a planographic printing surface in a molten or liquid metal adapted to act as the other element of a planographic printing surface, withdrawing said metal with its adherent coating of molten or liquid metal, allowing same to cool, applying a resist to a portion of the surface of the said layer or coating, applying a reducing agent to the exposed portions of said layer or coating so as to remove same, so that the said elements together constitute a planographic printing surface.

16. The process of producing a printing plate which consists in immersing a metal adapted to act as the ink-taking element of a planographic printing surface in a molten or liquid metal adapted to act as the ink-rejecting element of a planographic printing surface, withdrawing same with its adherent layer or coating of molten metal, allowing it to cool, and then removing the layer of ink-rejecting metal from that portion of the surface which is to constitute the design.

17. The process of producing a printing plate which consists in immersing a metal adapted to act as the ink-taking element of a planographic printing surface in a molten or liquid metal adapted to act as the ink-rejecting element of a planographic printing surface, withdrawing same with its inherent layer or coating of molten metal, allowing it to cool, applying a resist to the non-design parts of the surface, and then applying a reducing agent to the exposed portion of the surface so as to expose the surface of the ink-taking element to constitute the design in the planographic printing surface.

18. The process of producing a printing plate which consists in immersing a metal adapted to act as the ink-taking element of a planographic printing surface in a molten or liquid metal adapted to act as the ink-rejecting element of a planographic printing surface, withdrawing said metal with its adherent layer or coating, allowing same to cool, applying an acid-resistant material to those portions of the surface exterior to the design, applying an acid reducing agent to the exposed portions of the surface so as to etch or cut away the said layer or coating and to expose the surface of the ink-taking

element, then applying a solvent to the said resist to remove same.

19. A printing plate having a planographic printing surface wherein the design is defined in an ink-taking metal and the remainder of the surface consists of an ink-rejecting metal which has been deposited upon the surface of the plate in the molten state.

20. A printing plate having a planographic printing surface wherein the design is defined in an ink-taking metal and the remainder of the surface consists of an ink-rejecting metal which has been deposited upon the surface of the plate in the molten state and has been allowed to cool without being subjected to any influences tending to change or modify the structure and qualities which it naturally assumes on passing to the solid from the liquid state.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE R. CORNWALL.

Witnesses:

JOHN D. MORGAN,
CLARA PHILLIPS.