(No Model.)

H. GOODWIN.

PROCESS OF PREPARING PLATES FOR UTILITY AND ORNAMENT.

No. 444,952. Patented Jan. 20, 1891.

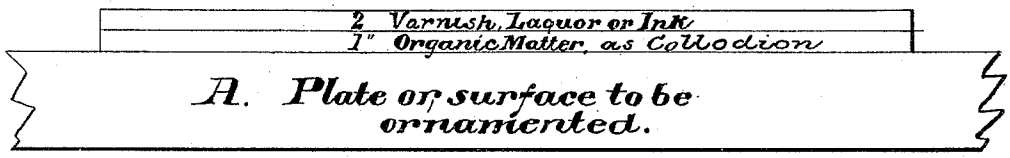


Fig. 1.

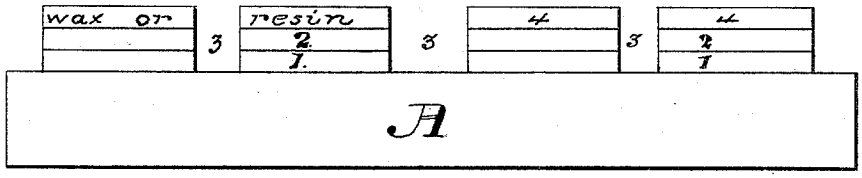


Fig. 2.

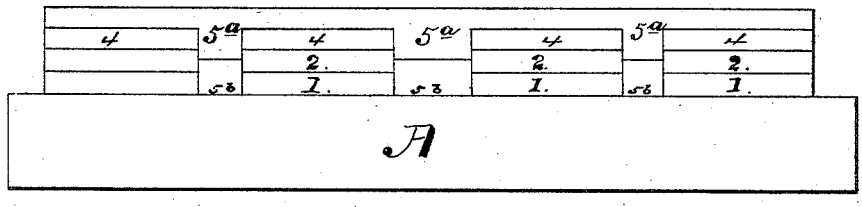


Fig. 3.

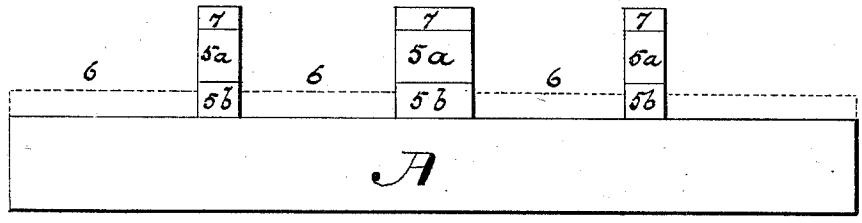


Fig. 4.

WITNESSES:

Oscar A. Michel.
E. L. Sherman

INVENTOR

Hannibal Goodwin,
BY Drake & Co ATTY'S.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HANNIBAL GOODWIN, OF NEWARK, NEW JERSEY.

PROCESS OF PREPARING PLATES FOR UTILITY AND ORNAMENT.

SPECIFICATION forming part of Letters Patent No. 444,952, dated January 20, 1891.

Application filed October 25, 1889. Serial No. 328,154. (No specimens.)

To all whom it may concern:

Be it known that I, HANNIBAL GOODWIN, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in the Process of Preparing Plates for Purposes of Utility and Ornament; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specificatiion.

This invention relates to an improved process of preparing plates or surfaces for purposes of utility or ornament, said purposes being effected by the electric current or by chemical agents. At present the usual process of preparing plates for decoration or purposes of utility by means of chemical engraving or by the deposition of metal varies, but is comprehended in the following three specifications: first, the application to the plate of a resist consisting of varnish, lacquer, or fatty ink on the ground and background of a design in case the design itself is to be operated on by chemical engraving or electro-deposition; second, the application of varnish, lacquer, or fatty ink on the design itself in case the ground and background are to be operated on by chemical engraving or by electro-deposition; third, the application of the varnish, lacquer, or fatty ink to the entire surface of the plate and then cutting away with a suitable tool the varnish, lacquer, or ink from just those parts of the plate on which it is proposed to operate by the chemical agent or galvanic current, leaving the adjacent parts covered with the resist. Such is the usual preparation for chemigraphic engraving in cases where the resist does not consist of a photographic impression made upon a sensitive film of gelatine, albumen, or asphaltum—that is to say, the parts of the plate left bare or made bare are the parts to be engraved or otherwise operated on, while the parts not to be operated on are covered by the resist; but it is often most desirable to reverse this order and secure opposite results—*i. e.*, to engrave out or deposit on those parts which are covered with the resist and leave intact those parts of the plate which are not covered with the resist. The great utility of securing such reversed results needs only to be mentioned in order to be appreciated by all engaged in the art. To effectually accomplish this is the object of my invention.

In the accompanying drawing the four figures illustrate the successive steps taken in carrying out the invention, the numbers employed on said figures indicating the order of the steps of the process.

The invention consists in the process of preparing plates for the purpose of utility or ornament, substantially as will be hereinafter embraced in the clauses of the claims.

I preferably first flow the plate with a thin solution of some organic matter, which may have either a greater adherence to the plate than the stratum of matter next to be applied or may have greater coherence with the stratum of matter next to be applied than the plate; or may possess a structure of greater pliancy than the said stratum so that a line may be cut through to the metal without causing any tearing, chipping, or other unevenness in the line, and such organic matter applied as a single film or followed by another may consist of collodion or other solutions of nitro-cellulose; albumen sensitized or charged with an alkaline bichromate and made pliant by glycerine, caseine, legumine, gluten of cereals, gelatine, gum-arabic, or aqueous or spirit solutions of lac; rubber, gutta-percha, gums, as elemic, mastic, and sandarac; waxy matter, as paraffine, and fatty matter, as tallow, or other analogous matters. With or without this preparation I (2) apply to the plate a thin film of varnish, lacquer, or fatty ink, and in doing this I either cover the complete surface or only such parts of the surface as will constitute the ground of the design or the design itself; and in the first case—*i. e.*, where the surface is wholly covered with a fatty ink or a varnish or lacquer, the said varnish and lacquer being either of the fatty or spirit order—I proceed to (3) cut from the layer of fatty ink, lacquer, or varnish either the ground of the design or the design itself, and in the latter case, where I apply the varnish or ink as the ground of the design or the design itself, my method of doing it is to employ either

the brush or some of the well-known transfer processes. If the tacky ink or varnish now constituting the ground of the design or the design itself is especially thin and without sufficient body, I next proceed (4) to brush on a finely-powdered dust, as of asphaltum, wax, and resin, and then thoroughly incorporate the same with the tacky matter, to aid which heat may be applied. Having next properly cleansed from the surfaces not covered with ink or varnish all foreign matter, I proceed (5) to apply to said cleansed parts a resist or film of insulating matter, varying in its character to the nature of the metal to be operated on as well as according to the nature of the work in hand, for the diverse metals to be operated on greatly differ as to the strength of acids required to engrave them, and also as to the degree of acidity or alkalinity of the electrolytic solution employed in the deposition or decomposition of metals. The work in hand also varies. It may be very fine or coarse, and very fine lines amid very broad spaces will be required to be protected differently from broad lines separated by very narrow spaces. Accordingly I apply to said cleansed parts of the plate a resisting film of a single fold or layer, or duplex the two differing in nature, or triplex, or even fourfold, each layer in each case differing from the rest. If, however, the work is very fine or one requiring considerable protection from acids or currents employed, I prefer to make (5^b) upon said cleansed parts a preliminary deposit of platinum or other metal which is slightly if at all affected by the corrosive fluids employed in engraving or in galvanic deposition or decomposition; or if the purpose be to decorate the plate by applying a metallic color to the above said cleansed parts, I in every such case give the preliminary deposit of a metal of such color as will be in suitable contrast to the color of the rest of the plate or to the color after to be applied to the rest of the plate. To proceed, in case a preliminary deposit of metal has not been made or in case it has been, I next (5^a) apply the following as a resist consisting of a single layer of especial organic matter, or as the first layer of a complex resist. I flow over the plate a solution of such especial organic matter as must possess all the following four properties or capacities:

First. It must not while in solution be repelled from the parts covered with fatty ink or varnish, but must rather attach itself to and adhere to said ink or varnish as well as attach itself to and adhere to those parts of the plate not covered with ink or varnish, such property being requisite in order that there be no unequal thickness or piling up of the matter upon the spaces adjacent to unequal widths of the inky and fat-covered boundaries. In the case where the plate is wholly covered with a layer of varnish, lacquer, or fatty ink, and then a design is cut through by a tool, the resist now to be applied to the parts made bare may have this first capacity or it may not, the matter depending upon the kind of lacquer or varnish through whose layer the design is cut. If said layer consists of a fatty lacquer or varnish, as of asphalt, then the resist to be flowed over must have the above-described property or capacity. If, however, the said layer consists of a spirit lacquer or varnish, then the resist to be flowed over must be different and of a nature hereinafter to be described, but still possess the three following properties:

Second. Its solvent must be such that it will not dissolve away the varnish, lacquer, or fatty ink over which it has been flowed.

Third. It must not itself be capable of being dissolved by the solvent which is to be employed in dissolving the varnish, lacquer, or ink on which it is flowed; but it must be of so porous a character that it may be penetrated throughout its depth by the aforesaid solvent of varnish, lacquer, or ink.

Fourth. It must not be soluble by the solvent of another resisting substance which is subsequently to be added as another layer of the compound film.

As answering the above requirements of a resist to be applied to a plate bearing a design consisting of a fatty varnish, lacquer, or ink, the following substances and solvents may be employed: gum-benzoin, gum-aloe, balsam of Tolu, podophiyllum, the softer copals, and other analogous substances dissolved in wood-spirit, glacial acetic ether, chloroform, fusel oil, alcohol, caprylic alcohol, or other analogous solvents. As answering the requirements of a resist to be applied to a plate bearing a design cut through a layer of spirit varnish or lacquer, the following substances and solvents may be employed: asphaltum, caoutchouc, balata, gutta-percha, or other analogous substances dissolved in oil of turpentine, oil of rosemary, boiled linseed-oil, naphtha, benzole, benzine, or other analogous substances.

Having flowed the plate with the above solution and having allowed it to consolidate by the evaporation of its solvent, I next proceed (6) to remove from the plate all the ink or varnish, with its overlying film of benzoin, but without disturbing any of the benzoin, which covers just those parts of the plate on which no ink or varnish was at first applied. To do this I apply to the plate naphtha or any other fluid which has the double property of first penetrating through the porous film of benzoin without dissolving it, and then into the underlying ink or varnish and dissolving the same, and consequently of undermining the foundation of the overlying film of benzoin. With a wad of cotton charged with the naphtha I sweep over the whole surface and readily remove all the undermined benzoin, together with its underlying ink or varnish.

Where a layer of spirit varnish or lacquer had been given to the plate through which a design was cut and over which the asphaltum

resist was flowed, I apply to the plate alcohol or its equivalent, which has the double property of first penetrating through the porous film of asphalt without dissolving it, and then into the underlying spirit varnish or lacquer and dissolving the same, and consequently of undermining the foundation of the overlying film of asphalt. With a wad of cotton charged with the alcohol I sweep over the whole surface and readily remove all the undermined asphalt, together with its underlying spirit lacquer or varnish. We have now no ink or varnish as a resist on those parts of the plate where it was first applied, and on those parts where no ink or varnish had been applied we in the one case have as a resist either a metallic deposit of platinum covered with a layer of benzoin or in the other case we have the benzoin alone, and on the plate which was wholly covered with a layer of spirit varnish or lacquer through which was cut a design we have no varnish or lacquer where it was left after said cutting away, and on those parts made bare by the cutting away of the varnish we have as a resist either a metallic deposit of platinum covered with a layer of asphaltum or in the other case we have the asphaltum alone.

Such is my single resist; but, as already stated, the nature of the metal to be operated on or the nature of the work in hand may be such as requires very strong insulating protection. In such cases either of the foregoing resists should receive further insulation. I proceed, therefore, to give re-enforcement by applying a second, or in some cases a third layer. In those cases where the last and now only remaining resist consists of benzoin, I pour over the plate a thin solution of a porous substance whose solvent will not dissolve away the benzoin which it covers and which it is intended to re-enforce. I specify among the many substances and solvents which I may employ the following: asphaltum, caoutchouc, balata, gutta-percha, vegetable pitch, coal-tar pitch, colophony, wax, the hardest of the copals, resinate of protoxide of copper, resinate of lead employed separately or in mixture, some of the many solvents for which are oil of turpentine, oil of rosemary, oil of cajeput, boiled linseed-oil, naphtha, coal-tar naphtha, benzole, benzine, rosin spirit, petroleum spirit, toluol, xylol, cumol; but in those cases where the last applied and now only remaining resist consists of asphaltum, I pour over the plate a thin solution of another kind of porous matter, and whose solvent will not dissolve away the asphaltum which it covers and which it is intended to protect. I specify among the many substances and solvents, which I may employ for this purpose, the following: gum-benzoin, gum-aloe, balsam of Tolu, podophyllum, dragon's blood, jalapin, guaiacum, myrrh, convolvulin, the softer of the copals, some of the many solvents for which are wood spirit, sulphuric ether, nitrous ether, glacial acetic ether, chloroform, acetone, creosote, fusel oil, some of the said solvents employed singly and others of them mixed in suitable proportions. When either the asphaltum or the benzoin solution is sufficiently set by the evaporation of its solvent, I immerse the plate into a bath of dilute hydrochloric acid and bichromate of potash or other fluid agents, which, while not dissolving the last-added film, will penetrate through it and disengage it and allow it to be removed by a brush from just those parts of the plate not covered with benzoin in the one case or the asphaltum in the other, but leave it intact where it is supported by the benzoin or the asphaltum. While this last layer added to the resist is yet in a tacky condition, I may apply to it a finely powdered resinous dust for still greater insulation.

The organic matter (1) when employed is porous and will not ordinarily serve as a resist.

In the accompanying drawings the four figures illustrate in some degree the several steps taken in carrying out the process, the numbers shown corresponding with the steps taken.

Having thus described my invention, what I claim as new is—

1. In the process of preparing plates for purposes of utility or ornament, the combination of the following elemental steps: first applying to a plate a design in varnish, lacquer, or fatty ink, then superposing a resist, then removing all said varnish, lacquer, or fatty ink, together with the overlying resist, and re-enforcing the remaining matter, substantially as set forth.

2. The process of preparing plates or surfaces for purposes of utility or ornament, which consists of applying to the plate a film of varnish, lacquer, or fatty ink, then cutting out a design in said film, leaving the plate partly bare, applying to the plate a resist or film of insulating matter, then removing from the plate all the ink, varnish, or lacquer and the overlying resist, re-enforcing the remaining resist or film of insulating matter, and then removing the last-added re-enforcing resist from all parts of the plate except where it immediately covers the first-applied resist, further operations or processes eventuating in the ornamentation of said plate or its suitableness for purposes of utility or ornament, substantially as set forth.

3. The process of preparing plates for purposes of utility or ornament, which consists of first flowing the plate with organic matter, such as collodion or collodion followed by a film of albumen, then applying a film of varnish, lacquer, or fatty ink, then cutting out the design with a suitable tool, leaving the plate partly bare and partly covered with the above films, applying to the plate a resist or film of insulating matter, then removing from the plate all the ink, varnish, or lacquer and the overlying resist, then re-enforcing the remaining resist or film of insulating matter, and then removing the last-added and re-

enforcing resist to all the parts of the plate except where it immediately covers the first-applied resist, substantially as set forth.

4. The process herein described, which consists in transferring to or brushing onto a plate a design in varnish, lacquer, or fatty ink, then re-enforcing the same with an insulating-dust, then flowing over the plate a solution of benzoin, then dissolving out the design in varnish, lacquer, or fatty ink, leaving intact the benzoin covering the parts that were bare, then flowing the plate with a solution of asphaltum, then re-enforcing the asphaltum by incorporating with it an insulating-dust, and finally removing this last-added re-enforced asphaltum from all the parts of the plate except where it immediately covers the first resist, substantially as set forth.

5. The process herein described, which consists in transferring to or brushing on a plate a design in varnish, lacquer, or fatty ink, then flowing over the plate a solution of benzoin, then dissolving out the varnish, lacquer, or fatty ink, then flowing the plate with asphaltum, then re-enforcing the asphaltum by incorporating with it an insulating-dust, and finally removing this last-added re-enforced asphaltum from all the parts of the plate except where it immediately covers the first-applied resist, substantially as herein set forth.

6. The process herein described, which consists in transferring to or brushing on a plate a design in varnish, lacquer, or fatty ink, then re-enforcing the same, then flowing the plate with benzoin, then dissolving out the varnish, lacquer, or fatty ink, then flowing with asphaltum, and finally removing said asphaltum from all the parts of the plate except where it immediately covers the first-applied resist, substantially as set forth.

7. The process which consists in transferring to or brushing on a plate a design in varnish, lacquer, or fatty ink, then flowing said plate with benzoin, then dissolving out the varnish, lacquer, or fatty ink, and flowing with asphaltum, and finally removing this last-added asphaltum from all parts of the plate except where it immediately covers the first-applied resist, substantially as set forth.

8. The process herein described, which consists in transferring to or brushing on a plate or design in varnish, lacquer, or fatty ink, then re-enforcing the same, then flowing the plate with benzoin, and then dissolving out the varnish, lacquer, or fatty ink, leaving on the parts first bare the benzoin as the only resist, substantially as set forth.

9. The process which consists in transferring to or brushing on a plate a design in varnish, lacquer, or fatty ink, then flowing the plate with benzoin, and finally dissolving out the varnish, lacquer, or fatty ink, leaving benzoin as the only resist.

10. The process which consists in transferring to or brushing on a plate a design in varnish, lacquer, or fatty ink, then re-enforcing the same, then depositing platinum on the bare parts, then flowing the plate with benzoin, then dissolving away the varnish, lacquer, or fatty ink, then flowing with asphaltum, and finally removing the asphaltum from all the parts of the plate except where it immediately covers the benzoin, substantially as set forth.

11. The process which consists in transferring to or brushing on a plate a design in varnish, lacquer, or fatty ink, then re-enforcing the same, then depositing platinum on the bare parts, then flowing the plate with benzoin, and finally removing the varnish, lacquer, or fatty ink, substantially as set forth.

12. The process which consists in first flowing a plate with a film of organic matter, as collodion, then transferring to or brushing on said collodion surface a design in varnish, lacquer, or fatty ink, then re-enforcing the same, then flowing the plate with benzoin, then dissolving out the varnish, lacquer, or fatty ink, then flowing with asphaltum, then re-enforcing the asphaltum, and finally removing this re-enforced asphaltum from all the parts of the plate except where it immediately covers the benzoin, substantially as set forth.

13. The process which consists of first flowing the plate with a film of organic matter, as collodion, then transferring to or brushing on said collodion surface a design in varnish, lacquer, or fatty ink, then flowing the plate with benzoin, then dissolving out the varnish, lacquer, or fatty ink, then flowing with asphaltum, then re-enforcing the asphaltum, and finally removing the re-enforced asphaltum from all parts of the plate except where it immediately covers the benzoin, substantially as set forth.

14. The process which consists in flowing a plate with a film of organic matter, as collodion, then transferring to or brushing on the collodion surface a design in varnish, lacquer, or fatty ink, then re-enforcing the same, then flowing with benzoin, then dissolving away the varnish, lacquer, or fatty ink, then flowing with asphaltum, and finally removing the asphaltum from all the parts of the plate except where it immediately covers the benzoin, substantially as set forth.

15. The process which consists in flowing a plate with a film of organic matter, as collodion, then transferring to or brushing on said collodion a design in varnish, lacquer, or fatty ink, then flowing with benzoin, then dissolving out the varnish, lacquer, or fatty ink, then flowing with asphaltum, and finally removing the asphaltum from all parts of the plate except where it immediately covers the benzoin, substantially as set forth.

16. The process which consists in first flowing a plate with a film of organic matter, such as collodion, then transferring to or brushing on said collodion a design in varnish, lacquer, or fatty ink, then flowing with benzoin, and finally removing the varnish, lacquer, or fatty ink, substantially as set forth.

17. The process which consists in applying to a plate a film of varnish, lacquer, or fatty ink, then cutting out a design in said film, leaving the plate partly bare, then flowing with benzoin, then dissolving out the varnish, lacquer, or fatty ink, then flowing with asphaltum, then re-enforcing the asphaltum, and finally removing the re-enforced asphaltum from all parts of the plate except where it immediately covers the first-applied resist of benzoin, substantially as set forth.

18. The process which consists in applying to a plate a film of varnish, lacquer, or fatty ink, then cutting out a design in said film, then flowing the plate with benzoin, then dissolving out the varnish, lacquer, or fatty ink, then flowing with asphaltum, and finally removing the asphaltum from all parts of the plate except where it immediately covers the benzoin, substantially as and for the purposes set forth.

19. The process which consists in applying to a plate a film of varnish, lacquer, or fatty ink, then cutting out a design in said film, then flowing with benzoin, and finally removing from the plate all the varnish, lacquer, or fatty ink, leaving the benzoin as the only resist, substantially as set forth.

20. The process which consists in first flowing a plate with a film of organic matter, such as collodion, then applying to said collodion-surface a film of varnish, lacquer, or fatty ink, then cutting out a design in said film, then flowing with such resisting matter as benzoin, then dissolving out the varnish, lacquer, or fatty ink, then flowing with asphaltum, and finally removing the asphaltum from all parts of the plate except where it immediately covers the benzoin, substantially as set forth.

21. The process which consists in first flowing a plate with a film of organic matter, such as collodion, then applying to said collodion a film of varnish, lacquer, or fatty ink, then cutting out a design in said film, then flowing with benzoin, and finally removing from the plate all the varnish, lacquer, or fatty ink, substantially as set forth.

22. The process which consists in applying to a plate a film of spirit lacquer or varnish, then cutting out a design in said film, then applying asphaltum as a resist, then dissolving out the varnish or lacquer, then applying benzoin to re-enforce the asphaltum, and finally removing the benzoin from all parts of the plate except where it immediately covers the asphaltum, substantially as set forth.

23. The process which consists in applying to a plate a film of spirit varnish or lacquer, then cutting out a design in said film, then applying asphaltum as a resist, and finally dissolving away the spirit lacquer or varnish, substantially as set forth.

24. The process which consists in first flowing a plate with a film of organic matter, such as collodion and bichromatized albumen, then applying to said film a spirit lacquer or varnish, then cutting out a design in said film, then applying asphaltum, then dissolving out the varnish or lacquer, then flowing with benzoin, and finally removing the benzoin from all parts of the plate except where it immediately covers the asphaltum, substantially as set forth.

25. The process which consists in flowing a plate with a film of albumen and bichromatized albumen, then applying to said film a film of spirit varnish or lacquer, then cutting out a design in said film, then applying asphaltum as a resist, and finally removing the lacquer or varnish, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of October, 1889.

HANNIBAL GOODWIN.

Witnesses:
CHARLES H. PELL,
OSCAR A. MICHEL.