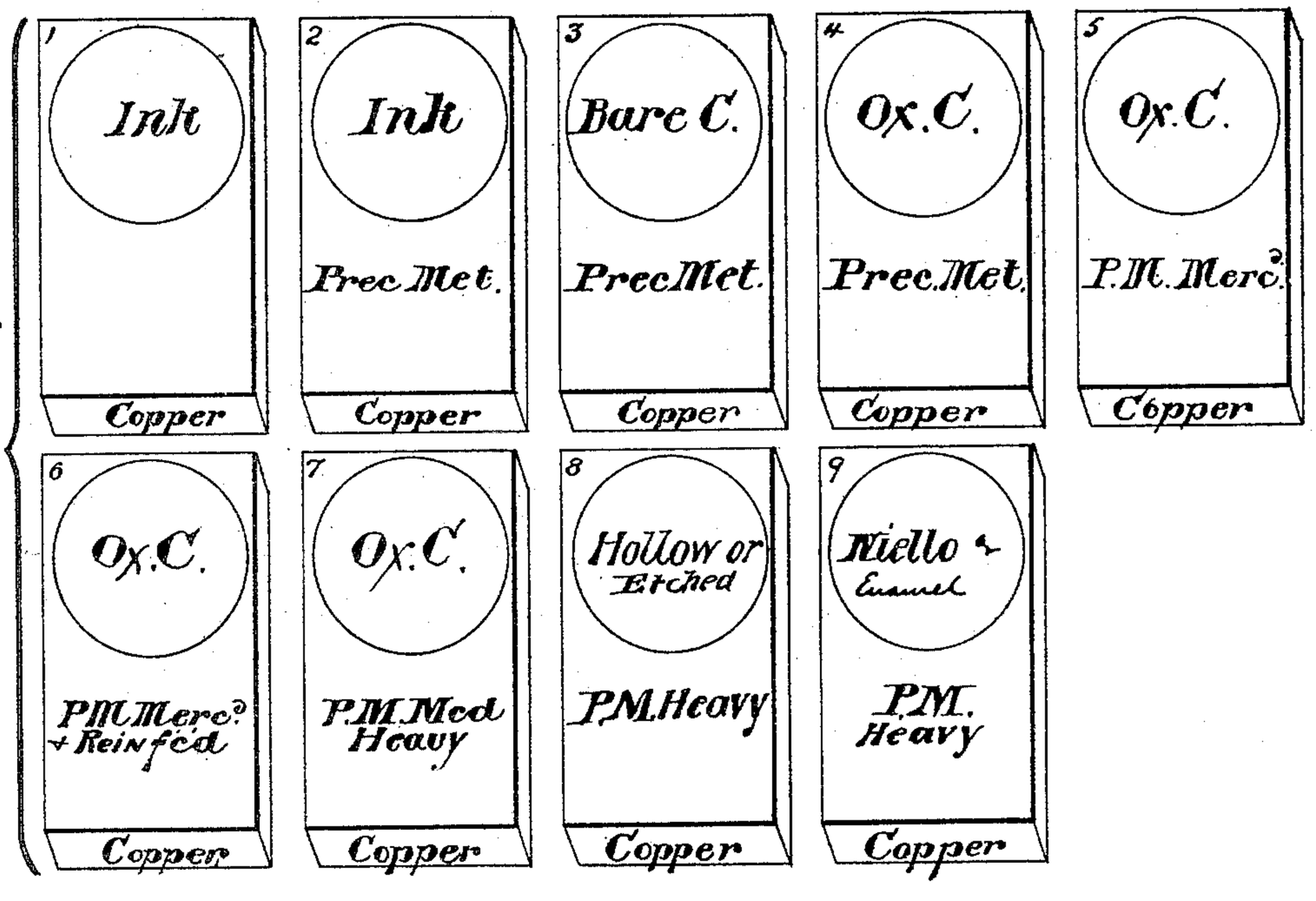
(No Model.) 2 Sheets—Sheet 1.

H. GOODWIN.

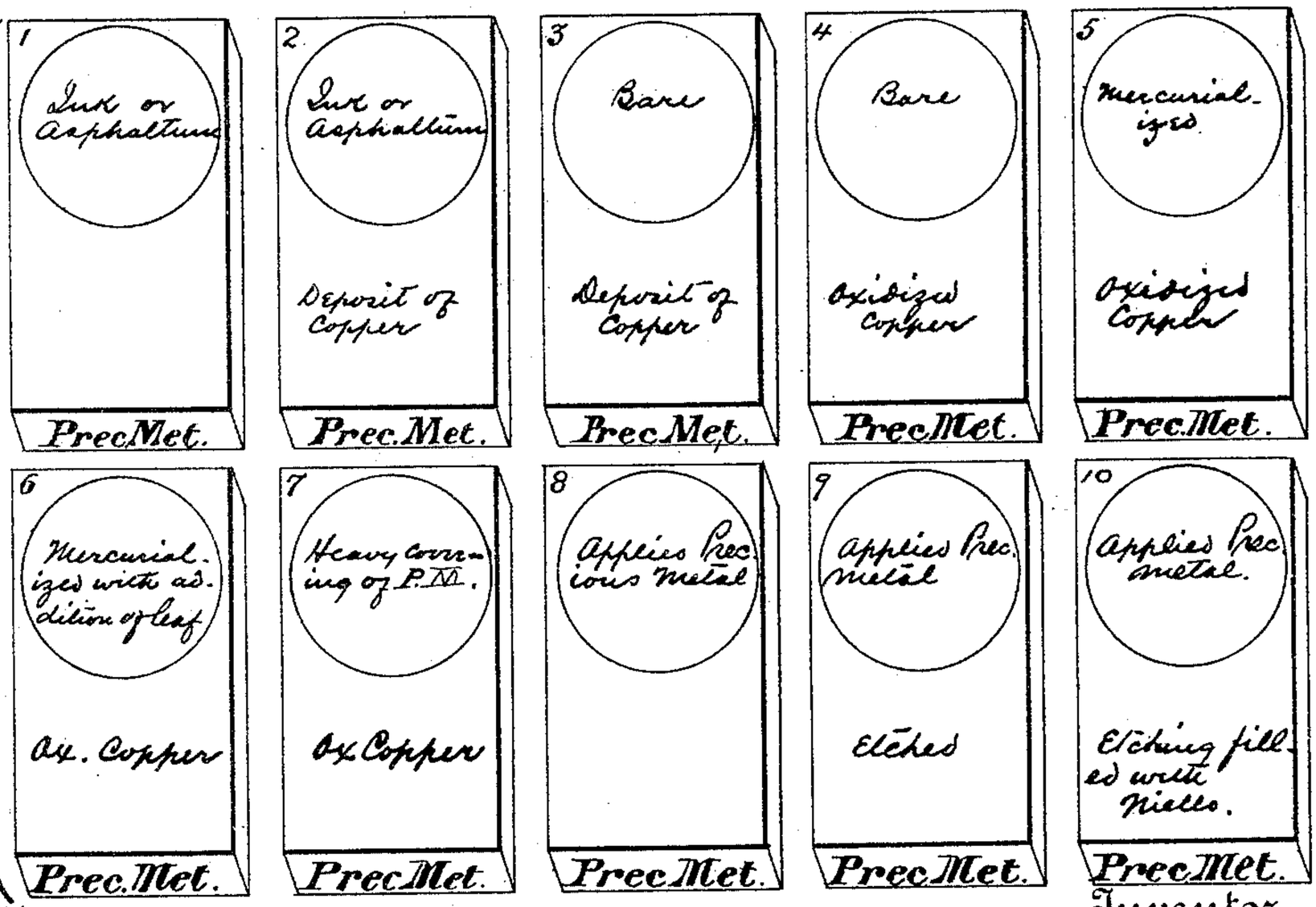
PROCESS OF PREPARING PLATES FOR PURPOSES OF UTILITY OR ORNAMENT.

No. 459,136. Patented Sept. 8, 1891.

Variety I.



Variety II.



Witnesses

Oscar A. Michel

R. B. Powell,

Inventor

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By Drake & Co Atty's.

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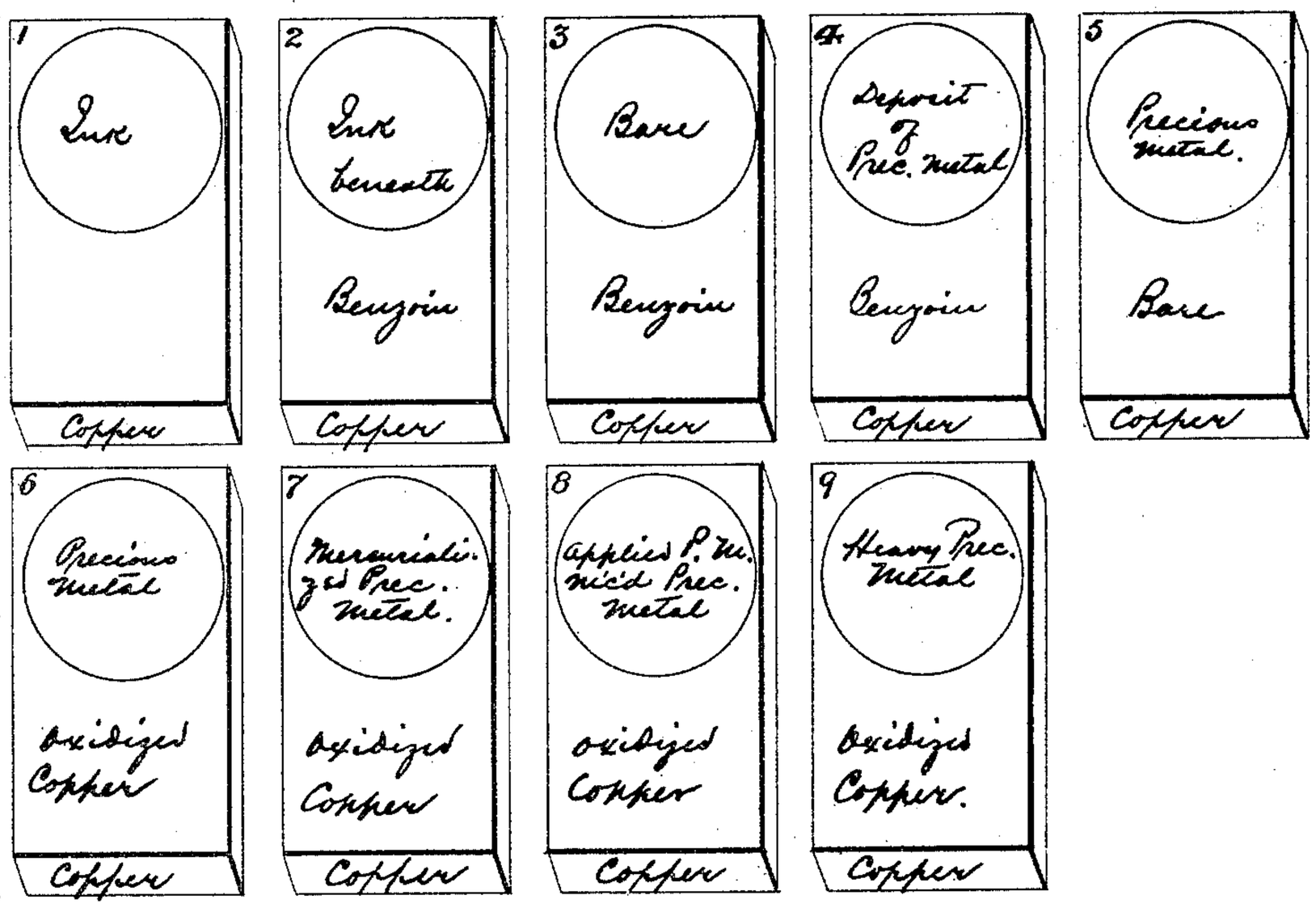
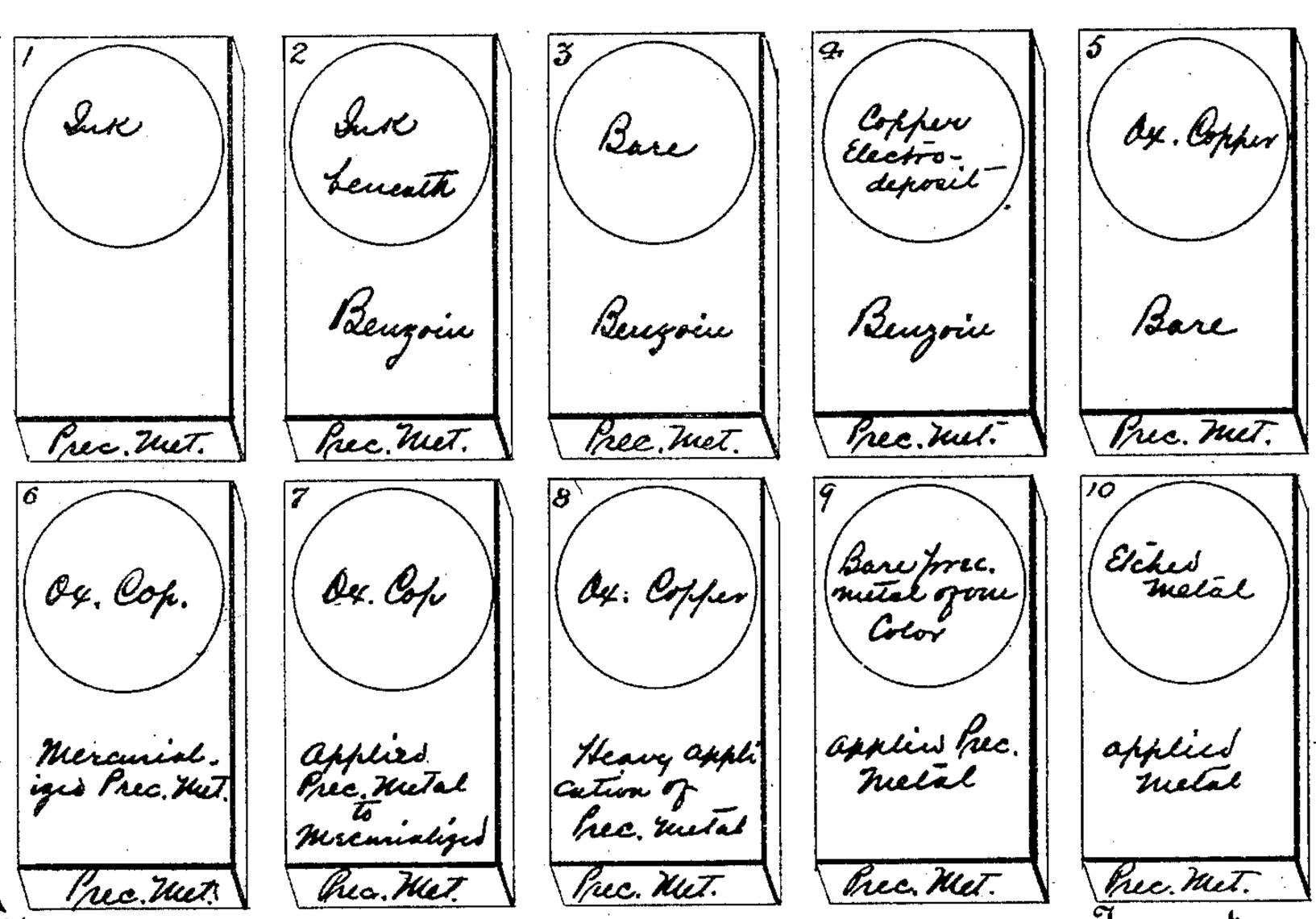
Variety III.



Variety IV.



Witnesses

Oscar A. Michel.

R. F. Bowell,

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UNITED STATES PATENT OFFICE.

HANNIBAL GOODWIN, OF NEWARK, NEW JERSEY.

PROCESS OF PREPARING PLATES FOR PURPOSES OF UTILITY OR ORNAMENT.

SPECIFICATION forming part of Letters Patent No. 459,136, dated September 8, 1891.

Application filed December 30, 1890. Serial No. 376,195. (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 or 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 drawing, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to certain specific processes for ornamentation of metallic surfaces referred to in a contemporaneous application, Serial No. 184,752, and patented subsequent to the date of filing hereof, January 20, 1891, No. 444,951, the object of the present improvements or the particular features herein claimed being to secure particular effects of ornamentation under certain specific conditions.

The invention consists in the improved process of ornamenting or securing decorative or useful effects, substantially as will be hereinafter set forth, and finally embodied in the claims.

The accompanying drawing or diagram shows four varieties in the process, series of plates being shown on which applications of matter are imposed in successive steps, the nature of the various applications being indicated.

The metals I operate on are either base or precious, and to all other base metals than copper I prefer to give a facing of copper prior to my operations thereon for purposes of ornamentation or utility.

The agencies I employ or the steps I take for producing my effects I here in a preliminary way specify:

First. The affixing to or imposing onto the plate to be decorated a figure or design composed of a fatty ink or of resinous matter—such as asphaltum—or of light hardened albumen covered with fatty ink or a resinous or fatty varnish, and any of the said materials so affixed or applied to the plate may constitute either the ground or the lines of the ornamental or useful figure. This said material, constituting either the ground or the lines of the figure, is applied to the plate either by the tracing-brush or the pen, or by any of the well-known transfer methods, or by helio-printing upon sensitized albumen followed by the usual inking and development of the figure.

Second. Another step is the removal of the fatty material from the ground, if to that portion of the figure it has been affixed, and the application of another material of a highly insulating nature upon the bare lines of the figure, or the removal of the material from the lines, if to that portion of the figure it has been affixed, and the application of another material of a highly insulating nature upon the bare ground of the figure.

Third. Another step in the series is the electro-deposition of metal upon those portions of the figure or picture which are bare metal, or, to be more specific, the deposition of precious metal upon those bare portions of the figure which show as base metal and the deposition of a base metal upon those bare portions of the figure which show as precious metal.

Fourth. Another step is the mercurial amalgamation of just those parts of the figure which consist of a precious metal, said precious metal having constituted the surface of the plate from the outset or having been applied during the process.

Fifth. Another step is the oxidation of just those portions of the figure which consist of a base metal, said base metal having constituted the surface of the plate from the outset or having been applied during the process.

Sixth. Another step is the welding to the mercurialized precious metal constituting either the lines or the ground of the figure more precious metal, either silver or gold, said welding being effected by the volatilization of the mercury.

Seventh. Another step is the deepening or hollowing out of those portions of the figure which have not been fortified by the welding on thereto of an added thickness of precious metal.

The foregoing are steps now to be better understood as I proceed to describe how my invention may be carried into effect.

Having gotten the figure upon the plate, the next step I take is determined by the nature of the metal upon which I am operating. If the plate be of copper or one faced with copper, I suspend it as a cathode in an electrolytic solution yielding a precious metal, and I thus get a deposit of silver or gold upon just those parts or portions of the figure not insulated by the fatty ink constituting the lines or ground of said figure, and it is this deposit of precious metal that I am further on to re-enforce by more precious metal applied by mercurial amalgamation and which I am thus to re-enforce for two reasons—first, because the greatest amount of precious metal capable of being applied by electro-deposition is too thin for many purposes, since the resisting matter on the adjacent parts is not sufficiently strong to admit of a thick deposit, and, second, because a precious metal applied by the process of mercurial welding is always more compact and more enduring, as well as more beautiful, than when applied by electro-deposition alone. Having gotten a deposit of precious metal upon the uninsulated portions of the figure, I next proceed to clear the figure of its fatty or other matter, and so lay bare those portions of the copper surface hitherto covered. These copper surfaces thus made bare by the removal of the insulating matter, I next proceed to oxidize, which I do by heat or by other means, and this oxidizing I carry so far that it will repel the mercury next to be added to the plate, and accordingly I next apply mercury to the plate, which, though repelled from the oxidized copper surfaces, readily unites with the silvered or gilded surfaces. Having mercurialized the surfaces of the precious metal, I next apply thereto silver or gold as a leaf or as an amalgam, and by so doing I can get the metallic coloring which is in the most harmonious contrast with the rest of the figure, and also a more solid and enduring covering than can be given by electro-deposition. I finally by heat evaporate the mercury, and so weld fast the applied films of gold or silver. The plate as it now stands is decorated to a certain extent, presenting, as it does, oxidized metal on a part of the figure and the natural color of silver or gold on the other parts; but to render this decoration more effective I may proceed to give a relief and a prominence to those parts of the figure now covered and represented by precious metals by hollowing or deepening the adjacent parts, employing a mordant or electrolytic solution which will not affect those parts of the figure covered by the precious metal, and then to make the decoration still more effective I may apply to the hollowed-out portions a coloring-matter, as niello or enamel. Thus far I have been describing my treatment of copper-bearing surfaces; but if the plate be one bearing a surface of precious metal then I vary the treatment. Instead of applying to the uninsulated portions of the figure a precious metal, I suspend the plate as a cathode into a solution of copper or of any other metal yielding a deposit which when oxidized will refuse amalgamation with mercury. Having thus made a deposit of base metal, I clear away, by proper solvents, the fatty or other organic matter which insulated the adjacent portions of the figure. I next oxidize the deposited copper by heat or other agency, and then I apply mercury, which will amalgamate with just those portions of the precious metal laid bare by the removal therefrom of the insulating matter and will be repelled by the oxidized copper-deposit. I next apply to these mercurialized portions of the figure a leaf or amalgam of silver or gold, the selected one being that which affords the best artistic contrast or harmony with the color of the original plate, and then to weld the applied leaf or amalgam I volatilize the mercury by means of heat. It now only remains to remove the oxidized copper from the underlying surface of precious metal, which I do by any of the well-known methods, such as the application of a solution of nitrate of silver. The plate at this stage is decorated, presenting, as it does, precious metal of one color upon certain portions of the figure and precious metal of another color upon other portions thereof.

To secure other and further ornamental effects or to obtain a plate for printing purposes, I proceed to hollow out or deepen just those portions of the figure from which the deposited copper has been removed, either by the use of a mordant which will not affect the leaf covering the adjacent portions of the figure or by electrolysis, employing a bath solution which will not affect the applied leaf. Thus far I have, in the case of plates possessing a surface of base metal, applied a precious metal to the uninsulated portions of the figure, and in the case of plates possessing a surface of precious metal I have added more and different precious metal to those portions of the figure which had been insulated by the fatty matter; but with reference to artistic effects or for purposes of utility it is in many and perhaps the majority of cases important to reverse the above-named positions of the added precious metal—that is, to apply in the case of plates of base metal the precious metal to those portions of the figure which are insulated by the fatty ink and in the case of precious metal to apply the contrasting precious metal to the uninsulated portions of the figure. To accomplish this, I have first to change the position of the resisting matter which constitutes the figure. If the fatty-ink resist constitutes the lines of the figure, then I apply a resist of different matter to the bare ground of the figure and clear away the fatty ink, so that I can operate upon just these surfaces laid bare, or, conversely, if the fatty-ink resist constitutes the ground

of the figure then I apply a resist of a different matter to the bare lines of the figure and clear away the fatty ink, so that I can operate upon just those surfaces thus laid bare, and my method of accomplishing this translation or transposition of the working resist is as follows: I flow over the plate having the inky figure a solution of some organic matter, such as gum-benzoin, which when set and dry is not soluble in a solvent of fatty ink. Benzoin is soluble in alcohol or its equivalent but is not in naphtha, which is a ready solvent of fatty ink. The film of benzoin or its equivalent having settled and stiffened, I proceed to dissolve out the fatty ink by rubbing with a wad of cotton containing naphtha, the naphtha readily penetrating through the benzoin covering the ink and dissolving away the latter. The portions of the figure that were at first bare are now covered with a resisting layer of benzoin, while those portions that were at first insulated by the fatty ink are now bare, and entirely bare, except in the one case where the figure consisting of fatty ink has been secured by helio-printing upon sensitized albumen followed by a covering of fatty ink. In this last case, after the removal of the ink by the application of the naphtha, as above described, the light hardened albumen remains, and this albumen I remove by the application of some of its solvents, such as acids. Those portions of the figure which at the outset were bare being now covered with resisting matter and those other portions of the figure which at the outset were covered with fatty ink being now bare, thus giving reversed positions in the figure for the application of a heavier coating of precious metal as well as one of diverse color, I proceed to effect this latter application in the following manner: In the case of a plate bearing a copper surface I suspend the same as a cathode in an electrolytic solution which will yield a precious metal, as silver or gold. I then remove the benzoin resist by its proper solvent, then oxidize the copper surfaces thus laid bare, then mercurialize the deposited precious metal, then apply to those mercurialized portions a precious metal of a fitting color, either in single or multiplied leaves or as an amalgam, and then weld the same by the evaporization of the mercury. In the case of a plate having a surface of precious metal I suspend the same as a cathode in an electrolytic solution which will yield a deposit of copper or any other metal which when oxidized will repel mercury. I then remove the benzoin resist by its proper solvent, then oxidize the deposited copper surfaces, then mercurialize the surface of precious metal laid bare by the removal of the benzoin, then apply to these mercurialized portions a precious metal of fitting color, either in leaf or as an amalgam, then weld the same by the evaporization of the mercury, and finally remove the deposited and oxidized copper. There remains a decorated plate presenting precious metal of one color upon certain portions of the figure and precious metal of another color upon other portions.

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

1. The process of preparing plates for purposes of decoration or ornament herein described, which consists in applying to the plate or surface to be decorated or prepared an inky or asphaltum resist, parts of said plate remaining bare and parts being covered with ink or asphaltum, securing by means of said inky or asphaltum resist a design or picture, in copper or other metal, which when oxidized will resist any amalgamating action of mercury, oxidizing said copper or its equivalent, and amalgamating the adjacent unoxidized surfaces and applying precious metal to the amalgamated surface, substantially as set forth.

2. The process of preparing plates herein described, consisting in applying to a metallic plate a resist in fatty ink or asphaltum, parts of said plate remaining bare, securing by means of said inky or asphaltum resist a picture, in copper or other metal, which when oxidized will resist the amalgamating action of mercury, oxidizing said applied metal, amalgamating the adjacent unoxidized surfaces, applying precious metal to the amalgamated surfaces, and finally evaporating the mercury, substantially as set forth.

3. The process herein described for preparing plates, which consists in applying to a precious-metal plate partial coverings of ink and copper, oxidizing the copper and removing the ink and amalgamating the precious metal exposed by the removal of the ink, and evaporating the mercury from the amalgam, substantially as described.

4. The process herein described, which consists in applying ink to a precious-metal plate, flowing the said inked plate with benzoin, removing the ink from the plate and depositing copper thereon, oxidizing the copper, and mercurializing the surface covered with benzoin, and applying leaf to the mercurialized surface, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 15th day of December, 1890.

HANNIBAL GOODWIN.

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