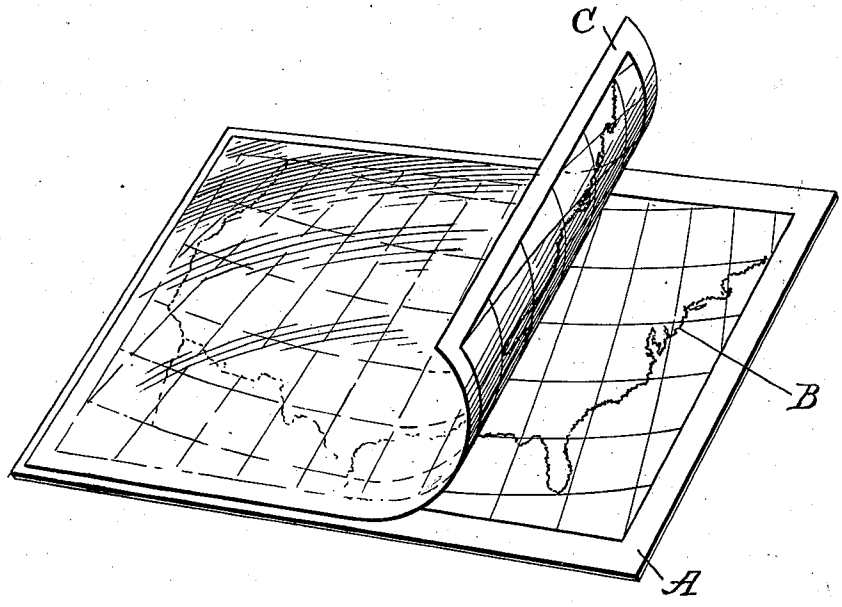
No. 702.693. Patented June 17, 1902.

R. F. BARTLE & A. B. HOEN.

PROCESS OF PRODUCING DESIGNS OR DELINEATIONS ON METAL SURFACES.

(Application filed Feb. 28, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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PROCESS OF PRODUCING DESIGNS OR DELINEATIONS ON METAL SURFACES.

SPECIFICATION forming part of Letters Patent No. 702,693, dated June 17, 1902.

Application filed February 28, 1902. Serial No. 96,183. (No specimens.)

To all whom it may concern:

Be it known that we, RUDOLPH F. BARTLE, a resident of Falls Church, in the county of Fairfax and State of Virginia, and ALBERT B. HOEN, a resident of the city of Baltimore, in the State of Maryland, citizens of the United States, have invented a new and useful Process of Producing Designs or Delineations on Metal Surfaces, of which the following is a specification.

Our invention relates to a process for producing a design or delineation on a metal surface to be engraved or for other purposes; and its main object is to furnish a cheap and simple method by which transfers may be made from a design or delineation to a copper or other metal plate which shall fulfil the requirements of the engraver's art.

Broadly stated, our invention consists in forming the design on a flexible sheet with a substance which will serve as a vehicle for a mordant, placing said sheet on the metal surface and applying pressure thereto for causing said substance to adhere in whole or in part to said surface, and causing the design to be chemically produced on the metal by a suitable mordant associated with said substance. The mordant may be incorporated with the vehicle prior to the formation of the design on the metal or it may be added to the vehicle thereafter, as will be hereinafter explained. Printers' ink has been successfully used by us as the vehicle for the mordant; but we do not wish to be confined to any particular vehicle, as any substance which will carry or hold a mordant will serve the main purposes of our invention. The best results will, however, be obtained by the use of a semisolid oily substance. The mordant which we have found best suited to our special purpose is sulfur; but any other chemical or compound may be substituted therefor which by chemical action will cause a discoloration or marking of the metal.

The manner of forming the design or delineation on the metal may be widely varied so far as the main feature of our invention is concerned; but we prefer to follow the novel process hereinafter described, by which the operation may be accurately, quickly, and cheaply performed and such design or delineation thereafter rendered permanent, as above indicated.

In carrying out our invention we first cause the design or delineation to be formed on a flexible sheet by printing or otherwise, the vehicle above referred to being employed for this purpose. The flexible sheet may be of any suitable material; but we prefer to use transparent celluloid, both because of its transparency and its ability to stand the action of a burnishing-tool when the latter is used for transferring the design to the metal surface. After the design has been formed on the flexible sheet and allowed to partially dry to prevent the vehicle from spreading said sheet is placed face down on the metal surface and subjected to pressure for causing the vehicle or a portion of it to adhere to said surface.

In the accompanying drawings we have illustrated a copper plate A to which a delineation B has been transferred from a flexible sheet C, the latter being shown as partially raised from the plate for disclosing the design formed on the sheet with the vehicle, as above described.

The mordant may be incorporated with the vehicle prior to forming the design or delineation therewith on the flexible sheet, or a mordant in powdered form may be dusted over the metal surface after the design has been transferred thereto from said sheet, a sufficient quantity of the mordant being retained or absorbed by the vehicle to act upon the metal and permanently affix the design thereon, care being exercised to remove from the metal all of the mordant not retained or absorbed by the vehicle. The mordant may be added to the vehicle by dusting it over the surface of the flexible sheet after the design is formed thereon and before it is transferred to the metal; but in this case the metal surface should be coated with a thin film of wax or other substance that will take hold of the mordant; otherwise the latter will prevent the vehicle from adhering to the metal. When the vehicle and mordant are initially incor-

porated, as before described, the presence of wax or a coating of similar substance on the metal surface is immaterial, it being of importance only in the variation of the process above described.

After the design has been formed on the metal with the vehicle and mordant it is only necessary to allow it to remain a sufficient length of time for the latter to act on the metal, and this time will of course vary according to the quantity of mordant carried by the vehicle. The vehicle may be thereafter removed from the metal in any suitable manner.

In order to quicken the action of the mordant, we subject the metal surface to moderate heat from a Bunsen or other burner and thereafter treat said surface with a bath of some suitable liquid carbon compound—as, for instance, benzin—the latter acting also to cleanse the metal of printers' ink when that substance has been used as the vehicle for the mordant. The heating of the metal insures contact of the sulfur therewith; but good results may be secured if this step in the process be omitted.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The herein-described process of producing a design on a metal surface which consists in forming the design on a flexible sheet with a substance which will serve as a vehicle for a mordant, placing said sheet on the metal surface and applying pressure thereto for causing said substance to adhere in whole or in part to said surface, and causing the design to be chemically produced on the metal by a suitable mordant associated with said substance.

2. The herein-described process of producing a design on a metal surface which consists in forming the design on a flexible sheet with a substance which will serve as a vehicle for a mordant, placing said sheet on the metal surface and applying pressure thereto for causing said substance to adhere in whole or in part to said surface, and associating a suitable mordant with said substance.

3. The herein-described process of producing a design on a metal surface which consists in mixing a suitable mordant with a suitable vehicle, forming the design with said compound on a flexible sheet, placing said sheet on the metal surface, and applying pressure to said sheet for causing said compound to adhere in whole or in part to said surface.

4. The herein-described process of producing a design on a metal surface which consists in forming the design on a flexible sheet with a substance which will serve as a vehicle for a mordant, placing said sheet on the metal surface and applying pressure thereto for causing said substance to adhere in whole or in part to the metal, associating a suitable mordant with said substance at any time prior to the next step in the process, and treating the metal surface to a bath of a suitable liquid carbon compound.

5. The herein-described process of producing a design on a metal surface which consists in forming the design on a flexible sheet with a substance which will serve as a vehicle for a mordant, placing said sheet on the metal surface and applying pressure thereto for causing said substance to adhere in whole or in part to said surface, associating a mordant with said substance at any time prior to the next step in the process, heating said surface, and thereafter treating it to a bath of some suitable liquid carbon compound.

6. The herein-described process of producing a design on a metal surface which consists in mixing a mordant with a suitable vehicle, forming the design with said compound on a flexible sheet, placing said sheet on the metal surface and applying pressure thereto for causing said substance to adhere in whole or in part to the metal, and thereafter treating the metal surface to a bath of some suitable liquid carbon compound.

7. The herein-described process of producing a design on a metal surface which consists in mixing a suitable mordant with a suitable vehicle, forming the design with said compound on a flexible sheet, placing said sheet on the metal surface and applying pressure thereto for causing said compound to adhere in whole or in part to the metal, applying heat to the metal surface and thereafter treating it to a bath of some suitable liquid carbon compound.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

RUDOLPH F. BARTLE.
ALBERT B. HOEN.

Witnesses.
THOMAS S. BROCK,
FRANKLIN P. MENDENHALL.