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R. A. MILLER

2,384,113

METHOD OF PREPARING ELECTROTYPES

Filed Dec. 28, 1942

Fig. 1.

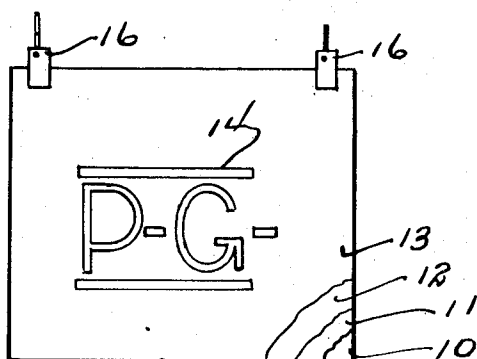


Fig. 2.

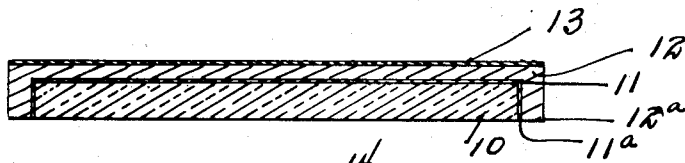


Fig. 3.

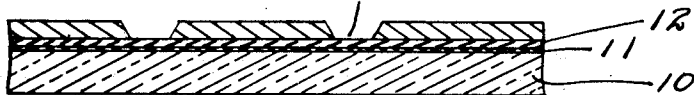


Fig. 4.

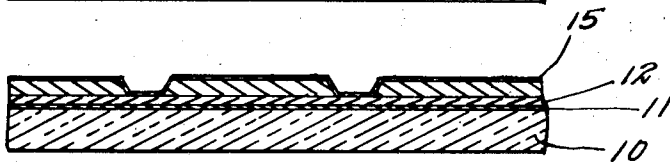


Fig. 5.

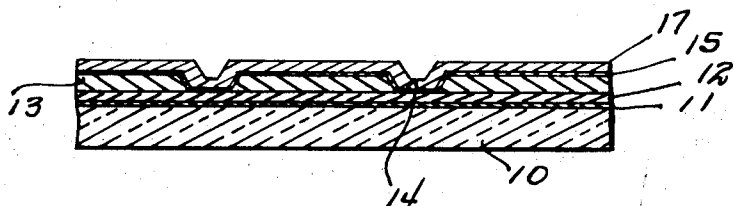
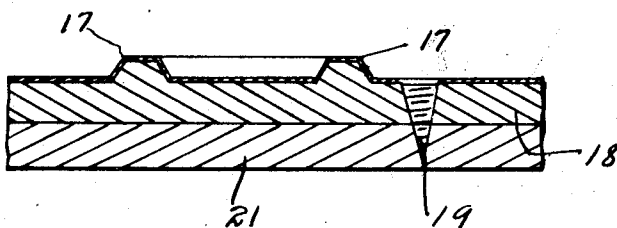


Fig. 6.



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METHOD OF PREPARING ELECTROTYPES

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1 Claim. (Cl. 204—6)

The present invention relates to the provision of an improved plate or base suitable for use in the manufacture of types by electrodeposition of copper.

One object of the invention is to provide a plate for forming electrotypes which does not require waxing, in order to prevent the deposition of copper upon the back of the plate during electrolytic deposition of the copper film of the type.

A second object of the invention is to provide a plate for the manufacture of electrotypes which can be prepared at but slight expense and which does not require the use of metals which are expensive or difficult to obtain.

These and other objects of the invention will be apparent from consideration of the following specification and claim.

For a better understanding of the invention, reference may now be had to the accompanying drawing in which like numerals refer to like parts throughout and in which

Fig. 1 is a side view of an electrotype plate ready for use and in which, for purposes of clarity, certain parts are broken away.

Fig. 2 is a sectional view of an electrotype plate embodying the invention.

Figs. 3, 4, 5, and 6 are fragmentary sectional views illustrating various stages in the preparation of an electrotype by the method herein disclosed.

The common method of preparing types for certain printing operations involves the electrolytic deposition of a shell of copper upon a suitable negative form, which shell is subsequently removed from the form. For purposes of providing a negative upon which the copper shell can be deposited it has heretofore been customary to coat a plate of copper with a layer of a mixture of paraffin wax and graphite. This mixture is electrically conductive and is also, soft and plastic so that it can be easily incised with a cutting or scratching instrument or can be indented to follow the contours of an object which may be pressed against it. In order to form a type by electrical deposition of copper upon such coated plate the wax is incised or otherwise indented and the surface is then thinly sprinkled with graphite. These plates may be hung in an electrolytic bath and subjected to an electrical current, in order to effect deposition of copper upon the graphite coated surface.

When a sufficient amount of copper has been laid down, the thin shell having a surface exactly matching the pattern or design in the wax,

is removed and backed with molten lead or an easily fusible alloy to give rigidity. The shell with the backing can then be attached by means of screws or other devices to wooden blocks to form the desired types.

It will be obvious that the back of the copper plate employed in the preparation of electrotypes is electrically conducted and in fact is a much better conductor than the layer of wax and graphite upon the surface. If the back of the plate were left uncoated much more copper would be deposited upon it than upon the face. Therefore, in order to speed up operations, to conserve materials and to prevent the plate from being excessively thickened it is customary to apply thereto a layer of wax. This waxing operation requires a certain amount of time and material, thus increasing the costs of the operation. It will further be apparent that the copper plate itself is expensive and, under present conditions, is very difficult to obtain.

In accordance with the present invention it is proposed to provide a plate for preparing electrotypes, which plate comprises a backing of glass having a relatively thin coating of copper adherent to the base thereof and constituting a copper support for the layer of wax and graphite.

In the preparation of such plate it is convenient to employ a plate of glass which should be ground to a relatively uniform surface and which may also be highly polished. Large quantities of plate glass suitable for the purpose are produced in the glass industry and can be obtained at but slight expense. The face of the glass plate which is to receive the conductive layer is preferably provided with a mirror film of silver, aluminum or other suitable mirroring composition. Conventional methods of depositing the mirror film may be employed. For example, the method known as anodic sputtering is satisfactory. However, probably the most convenient would involve deposition of silver from a solution of a soluble silver compound, such as ammoniacal silver oxide. The deposition of the metallic silver from the solution is effected by the addition of a reducing agent, such as tartaric acid or the like. Methods of mirroring which may be employed are conventional and need not be discussed in detail.

The mirrored surface may receive a plating of copper or of silver or other suitable metal by conventional process of electrolysis, which need not be discussed. After a sufficient thickness of metal, e. g., .01 inch has been laid down, the plate is ready for use in the formation of elec-

trotypes. The preparation of such type follows conventional procedure, a layer of wax and graphite being laid upon the face of the plate and then incised or indented in any convenient manner to conform to the desired design. The plate is then dusted lightly with graphite and immersed in a suitable electrolytic bath, such as a solution of copper, silver or any other electrolytically depositable metal which may be desired in forming electrotypes. A thin shell of metal is deposited over the layer of graphite having a face exactly following the contours of the imprint in the wax coating upon the supporting plate. The shell is subsequently backed, with lead, a fusible alloy or even a fusible or thermoplastic resin and trimmed and applied to a suitable supporting base, such as a block of wood.

The various stages involved in the preparation of a plate for the formation of electrotypes is illustrated in the drawing in which like numerals refer to like parts throughout. A backing plate 10 of glass preferably ground and polished to a smooth uniform surface is provided upon one face with a thin film 11 of silver, which provides a conductor of electricity and the film carries in turn a layer 12 of copper or the like deposited electrolytically by conventional methods employed in the backing of the better grades of mirrors. It is, of course, also apparent that the layer 12 may be of silver or other metal. It is to be noted in Fig. 2 that the metallic films 11 and 12 are continued down over the edges of the glass as indicated at 11a and 12a. This aids in preventing the copper from pulling the silver from the glass. The metal provides a surface upon which the layer 13 of wax and graphite is spread. The layer of metal spreads the current so that the wax layer is not overheated and softened at any one point during plating operations. The wax and graphite are incised or indented as indicated at 14 in Fig. 3 to provide the design. This indented surface is provided with a thin layer 15 of graphite, illustrated in Fig. 4.

Contacts 16 are attached to the plate and the plate is immersed in an electrolytic bath. The shell of the electrotype indicated at 17 in Fig. 5 is then deposited upon the graphite layer and

may be stripped away and provided with a backing 18 of lead or other fusible substance applied in molten state. The resultant body is sufficiently strong to be attached by means of screws or other devices 19 to a supporting block 21, of wood or the like. The resultant type is then ready for use in printing operations.

It is of course apparent that the method herein illustrated is suitable for forming bodies having irregular or curved surfaces. For example, objects of blown glass, pressed glass or the like might receive a coating layer of silver applied by a mirroring process. A silver film could then be electroplated, coated with wax and graphite and employed to provide the form upon which an electrotype shell could be deposited. The resultant shell after receiving a suitable backing of sprayed or cast metal could be employed as molds or for other purposes.

It will be apparent that the glass plates herein disclosed may be replaced by plates of plastic which are also susceptible of receiving mirror films. Copper can then be deposited upon these films to provide a surface that will support a conductive wax-graphite mixture suitable for engraving with designs to be reproduced.

The forms of the invention herein shown and described are to be regarded merely as exemplary. It will be apparent to those skilled in the art that numerous modifications may be made therein without departure from the spirit of the invention or the scope of the appended claim.

What I claim is:

A method of preparing electrotypes, which comprises applying a mirror film of conductive material to a glass plate providing a non-conductive supporting base, electrolytically depositing a layer of metal of substantial thickness upon the mirror film, the film and the layer being deposited upon and continuously around the edge of the glass plate, coating the layer with a mixture of wax and a pulverulent electrolytically conductive material, forming a depressed design in the wax, electrolytically depositing a shell of metal upon the wax, removing the shell, reinforcing the shell to form an electrotype.

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