Oct. 8, 1940. M. F. BECK 2,217,039

PRINTING AND REPRODUCTION PLATE

Filed June 2, 1938

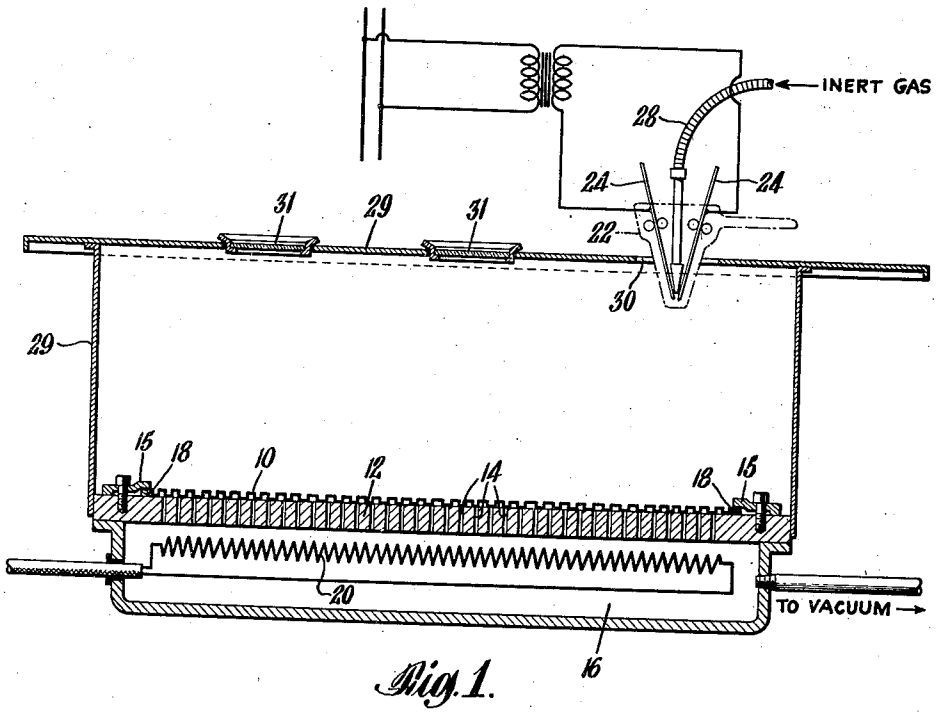

Fig. 1.

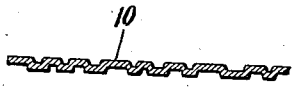

Fig. 2.

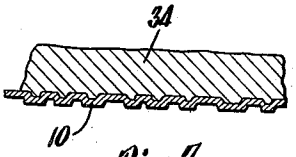

Fig. 3.

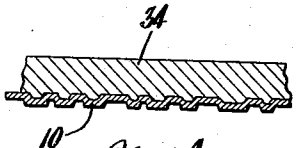

Fig. 4.

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PRINTING AND REPRODUCTION PLATE

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7 Claims. (Cl. 41—25.5)

The present invention relates to a novel and improved process for the production of printing plates and more particularly to a process for producing plates which may be used for reproduction.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel compositions of materials, combinations and improvements herein shown and described.

Of the drawing:

Fig. 1 is a schematic view showing the process, in accordance with the present invention, of increasing the thickness of the plate;

Fig. 2 is a schematic sectional view of a typical and illustrative view showing an electrotype shell for use in the process of the present invention;

Fig. 3 is a similar view of such a shell backed in accordance with the present process; and

Fig. 4 is a sectional view of a typical finished plate produced in accordance with the invention.

The present invention has for its object the provision of a novel and improved process for producing a plate which may serve as an original plate for the production of other duplicate plates by electrotyping. A further object is the provision of an improved process of "backing" an electrotype shell so as to bring it to standard plate thickness. The invention also provides an improved process of rapidly depositing a relatively thick backing of relatively hard metal upon an electrotype shell.

In the preparation of printing plates for use by magazine printers, an original photoengraving, with or without type matter, is prepared and duplicates must be made for shipment to the different printers. These printers then prepare duplicate electrotypes in sufficient number to supply the different presses on which the magazines are to be printed. In this way, each press of each printer is supplied with a duplicate plate. In order to save the expense of preparing a separate original for use by each magazine, duplicates have been prepared by electrotyping so as to produce a plate of solid electrodeposited copper, but this requires a long period of time for the deposit of such an amount of copper, also, a thick electrodeposited plate has been filled in with molten hard metal so as to bring it to standard plate thickness.

According to this invention the plates are prepared by depositing on the mold a relatively thin electrotype shell which is then built up to slightly more than standard thickness by spraying on the back of the shell a molten hard metal, such as copper. During this operation, the shell is preferably clamped by its edges to a heated flat surface and is additionally secured to this surface by means of vacuum. The shell and spray are preferably enclosed within a housing which permits the maintenance of an inert atmosphere so as to prevent oxidation of the metal as it is sprayed. The sprayed metal is applied locally to the back of the electrodeposited shell and after the standard thickness has been exceeded, the back of the plate is shaved, ground or otherwise cut until the plate is reduced to standard or desired thickness.

It will be understood that the foregoing general description and the following detailed description as well, are exemplary and explanatory of the invention but are not restrictive thereof.

More in detail, the process of the present invention is preferably carried out by first preparing an electrotype shell 10 of electrodeposited copper preferably having a thickness of 0.010" to 0.020". The back of this shell is thoroughly cleaned, as by sand-blasting, and the shell is then clamped at its edges by clamps 15 onto a rigid flat surface 12 somewhat larger than the shell. This flat surface is provided with a number of small holes 14 extending downwardly into a suction chamber 16 so that suction may be applied to the face of the shell to secure the entire area of the shell firmly against the surface. A packing strip or gasket 18 may be provided around the edge of the shell 10 so as to enable a better vacuum to be obtained.

The surface against which the shell is clamped and held is preferably heated by resistance 20 so as to maintain the shell in a heated condition and approximately at the temperature of the molten metal spray as it is deposited on the back of the shell. By having these temperatures the same, warping of the shell is substantially avoided.

The backing metal is preferably a relatively hard metal, such as copper, and is sprayed by means of a metal spray gun 22. In this gun, relatively coarse copper wire 24 is fed continuously in two strands, and electrical energy is supplied to these copper wires so that an arc may be maintained between the ends of the copper wire to melt the copper wire as it is fed. The metal melted by the arc is blown into a spray and

projected towards the back of the clamped shell by means of a stream of compressed non-oxidizing gas, supplied through tube 28, such as carbon dioxide or nitrogen.

Surrounding the plate is a hood 29 having apertures 30 into which the gun 22 may be placed so as to maintain the spray unoxidized from the time it is melted until it is deposited and adherent upon the cleaned back of the shell 10. The apertures 30 not in use may be closed by transparent covers 31 through which the operator may view the operation.

The sprayed metal 34 is deposited on the back of the shell until the shell and deposited metal has a thickness of 0.070'' to 0.080'', or slightly in excess of the desired thickness of the finished plate. Then the backed-up shell is placed on another flat surface and is shaved or cut to a perfectly flat surface by means of a milling cutter, grinder or otherwise. When cut, the plate is ready to be trimmed for proper size and may then be used as an original for the production of lead or wax molds for the production of further duplicate electrotypes.

The sprayed metal back, not being oxidized, has much more strength than the usual sprayed metal, and is not substantially compressible at the pressures used in lead molding. Warping of the plate is substantially eliminated by the heating of the shell to the same temperature as the sprayed metal, and additionally the secure holding of the shell during spraying assists in producing a flat plate.

The process of the present invention, due to its rapidity and the quality of the plates which may be produced, is particularly adapted to the commercial production of "reproduction plates" such as are required by the various periodicals.

The invention in its broader aspects is not limited to the specific steps and compositions shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. The process of producing electrotypes which comprises holding an electrotype shell on a true surface, heating the shell, spraying a molten hard metal on the back of the shell to produce a substantially solid metal backing until the back of the entire plate is substantially flat and cutting the plate to a uniform thickness.

2. The process of producing electrotypes which comprises clamping an electrotype shell on a true surface, heating the shell, spraying a molten hard metal on the back of the shell to produce a substantially solid metal backing until the back of the entire plate is substantially flat and cutting the back of the plate to render it smooth and flat.

3. The process of producing electrotypes which comprises securely holding an electrotype shell on a true surface, spraying a molten hard metal on the back of the shell by means of compressed inert gas to produce a substantially solid metal backing until the back of the plate is substantially flat and cutting the back of the plate to render it flat.

4. The process of producing electrotypes which comprises securely holding an electrotype shell on a true surface, heating the shell, spraying a molten hard metal on the back of the shell by a compressed inert gas to produce a substantially solid metal backing, until the back of the plate is substantially flat, and cutting the back of the plate to render it flat.

5. The process of producing electrotypes which comprises heating an electrotype shell, spraying a molten hard metal on the back thereof using compressed inert gas to produce a substantially solid metal backing until the back of the shell is substantially flat, and removing metal from the back until the plate is flat and of a predetermined thickness.

6. The process of producing electrotypes which comprises holding an electrotype shell by vacuum against a heated surface, spraying a molten hard metal on the back thereof using a compressed inert gas to produce a substantially solid metal backing until the back of the shell is substantially flat, and removing metal from the back until the plate is flat and of a predetermined thickness.

7. The process of producing electrotypes which comprises heating an electrotype shell, spraying a molten, relatively hard metal on the back thereof to produce a substantially solid metal backing while maintaining the molten metal against oxidation and maintaining the shell flat by suction applied to its face.

MARK F. BECK.