Jan. 9, 1923. 1,441,885.

F. N. SANFORD.

APPARATUS FOR PLACING BACKS UPON OBJECTS.

FILED MAR. 25, 1921.

Fig. 1.

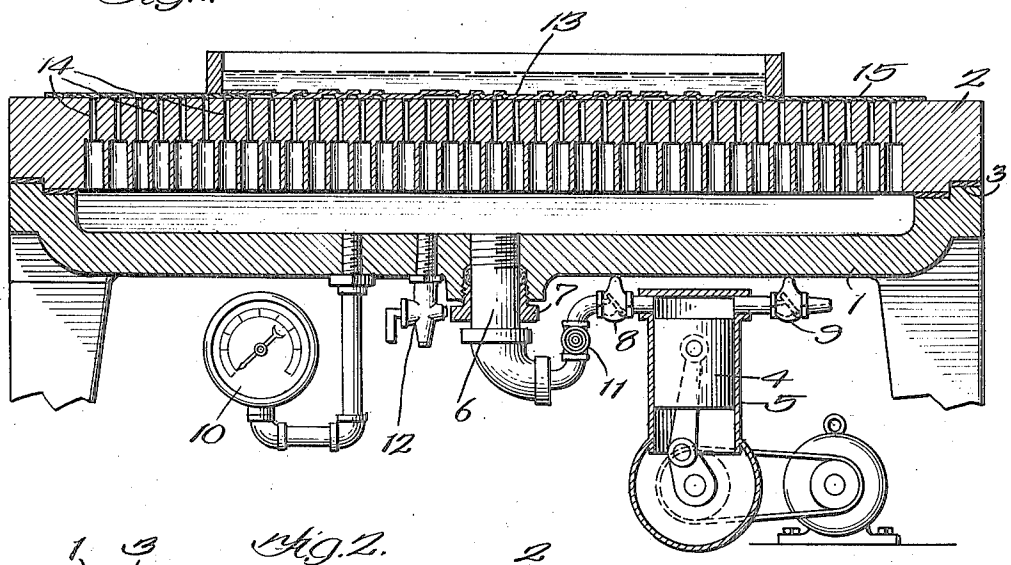


Fig. 2.

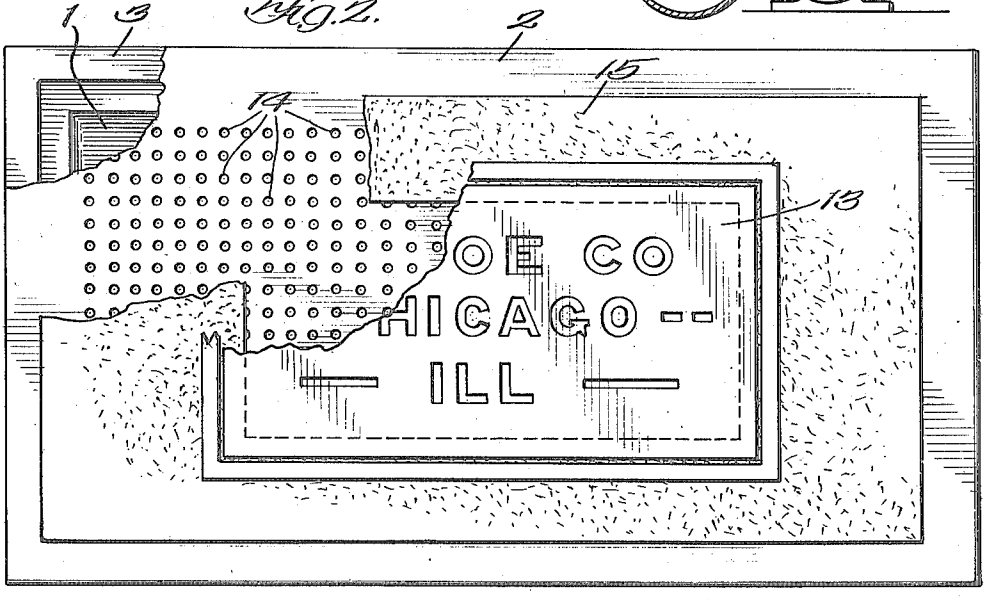


Fig. 3.

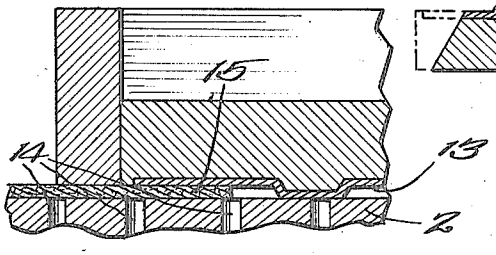
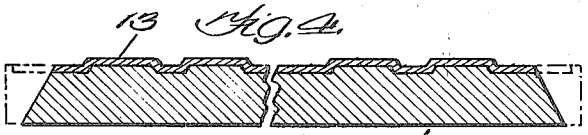


Fig. 4.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PLACING BACKS UPON OBJECTS.

Application filed March 25, 1921. Serial No. 455,452.

To all whom it may concern:

Be it known that I, FLOYD N. SANFORD, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Apparatus for Placing Backs Upon Objects, of which the following is a full, clear, concise, and exact description.

My invention relates to a method of and apparatus for preparing thin objects for the reception of stiffening backs and also, in the preferred embodiment of the invention, placing backs upon such objects while the objects are held in preparation therefor, though the invention is not to be thus limited. The invention is of particular service in providing electrotype plates with metal backs.

In carrying out my invention a thin object to be mounted, such as an electrotype plate, is placed against a support whose engaged surface conforms to an external surface that such object is designed to have when backed. For example, if an electrotype plate is to be so backed as to be flat, the printing face of the electrotype plate is initially placed against the perfectly flat surface of an iron or steel plate. In accordance with the preferred form of the apparatus of my invention, this plate is a wall of a chamber that is connected with an air pump which serves to exhaust air from such chamber. The exterior surface of this chamber wall is perfectly flat or otherwise shaped to conform to the printing face that the electrotype should possess. This chamber wall is preferably provided with numerous perforations that establish communication in the preferred way between the exterior and interior of the chamber. Some of these perforations are closed by the electrotype plate, and those which may not thus be closed are otherwise closed as by some refractory material, such as asbestos sheeting. When the air pump is operated to withdraw air from the interior of the chamber, the external atmosphere presses upon the electrotype plate to cause intimate contact between all of the printing surface of this plate and the perfectly flat or other suitably shaped exterior face of the perforated chamber wall. While the electrotype plate is thus under air or other fluid pressure self-hardening material such as liquid or molten metal is poured or otherwise placed upon its back or lower surface, a flask for receiving the molten metal desirably surrounding the electrotype plate and resting upon the asbestos sheeting. After the molten metal is sufficiently cooled, the air or fluid pressure is relieved and the electrotype plate and its backing are trimmed to proper shape.

The process and apparatus of my invention will be fully explained by reference to the accompanying drawing showing the preferred form of apparatus for practicing the method of my invention. In the drawing Fig. 1 is a view in sectional elevation of the preferred equipment; Fig. 2 is a plan view with parts broken away; Fig. 3 is a view on a larger scale of a portion of the equipment as it appears in Fig. 1; and Fig. 4 is a sectional view of an electrotype plate with its metallic backing in the final form thereof, a section being broken away for lack of space.

Like parts are indicated by similar characters of reference throughout the different figures.

The chamber illustrated includes a bottom wall portion 1 and a top wall portion 2 assembled therewith, the meeting surfaces of these wall portions engaging sealing gaskets 3 interposed therebetween. Any suitable form of air pump may be employed. That illustrated includes a reciprocated piston 4 operating within a cylinder 5. This cylinder is connected with the interior of said chamber by means of piping 6 that extends through the bottom wall 1 and is placed in sealed connection therewith by the stuffing box 7. A check valve 8 permits the passage of air from the chamber to the pump cylinder but prevents reverse flow of the air. Another check valve 9 permits displacement of the air from the pump cylinder on the non-pumping stroke of the pump piston, this valve being closed on the pumping stroke of the piston.

A pressure gauge 10 is connected with the interior of the chamber 1—2 to measure and indicate the extent to which air is withdrawn from the interior of the chamber and the consequent atmospheric pressure upon the exterior of the chamber. A valve 11 is employed to connect the air pump with or disconnect it from the chamber and another valve 12 serves to readmit air to the interior of the chamber when the process has been completed, to permit of the removal of the

product and to prepare the apparatus for a renewal of the process for backing a new plate.

An electrotype plate which is to be furnished with a metal back in accordance with the process and apparatus of my invention is illustrated at 13. Wall 1 is provided with numerous perforations 14.

As is now understood, the outer surface of the chamber wall 2 that has the openings 14 extending thereto conforms exactly to the printing face of the electrotype plate. In the instance shown, the printing face of the electrotype plate is flat or is to be made so and the exterior surface of the chamber wall 2 is, therefore, correspondingly flat. In carrying out the process, the printing face of the electrotype plate is placed against the outer face of the wall 2 that is to bring it as nearly as possible into its desired shape, and all of those perforations 14 which are outside of the area of said plate are sealed, as by means of sheeting 15 of asbestos whose inner edge portions are overlapped by the edge portions of the plate. The air pump may then be set into operation to withdraw the air from the chamber to a sufficient extent to create sufficient atmospheric pressure upon the back or non-printing face of the electrotype plate to force the printing face of this plate into intimate contact with the perfectly flat exterior surface of the wall 2, whereby this printing surface of the plate becomes more nearly perfect. While said plate is thus constrained into more nearly perfect form, a layer of molten metal, constituting the preferred form of self-hardening liquid, is poured upon the back of the plate to an extent that is limited by the flask which surrounds the plate 13 and which is supported by the sheeting 15. After the stiffening layer of metal has cooled, the valve 12 is opened to admit air to the central portion of the chamber to cool the central portion of the electrotype which is usually the last to cool, thereby avoiding shrinkage of this portion of the electrotype. Atmospheric pressure upon the electrotype is also relieved to permit of its removal from the apparatus and subsequent dressing to the proper shape, such as that illustrated in Fig. 4.

In addition to making the printing face of the electrotype plate more perfect by the mere action of atmospheric pressure, the air suction serves to withdraw any small volumes of air or gas that may be pocketed between the printing face of the plate and the support upon which it is atmospherically pressed.

As I have disclosed my invention, the metal backs are applied to the electrotype plates while these plates are held under restraint to conform as nearly as possible to the perfect shapes desired for them. However, it is apparent that the apparatus and process of my invention are of service in bringing the plates to better form whether the backs are applied thereto or not, while held in such form.

While I have herein shown and described the preferred apparatus of my invention and have described my preferred method, I do not wish to be limited to these embodiments of the apparatus and method of my invention, as changes may readily be made without departing from the spirit of my invention, but having thus described my invention I claim as new and desire to secure by Letters Patent the following:—

1. Apparatus for shaping a thin object which includes a chamber having a wall formed with numerous perforations establishing communication between the interior and exterior of the chamber, the exterior surface of said wall serving to define a surface of the thin object that is placed against the exterior surface of said wall to cover some of said perforations; means for closing those perforations which are not covered by the thin object; and means for exhausting air from the chamber.

2. Apparatus for placing a back upon a printing plate which includes a chamber having a wall formed with numerous perforations establishing communication between the interior and exterior of the chamber, the exterior surface of said wall serving to define the printing face of said plate that covers some of said perforations; sheeting covering those perforations which are not covered by the plate; a molten metal receiving flask disposed upon said sheeting and surrounding the plate; and means for exhausting air from the chamber.

In witness whereof, I hereunto subscribe my name this 23rd day of March A. D., 1921.

FLOYD N. SANFORD.