Aug. 19, 1924. 1,505,082

H. M. BLAETZ

PROCESS AND BACKING FOR USE IN LEAD MOLDING FOR ELECTROTYPES

Filed July 24, 1920

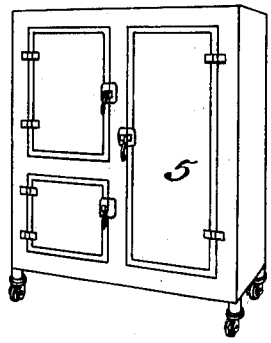
Fig. 1.

PRINTERS AVOCATIONS: PRINT COLLECTING

By HENRY LEWIS BULLEN

A room hung with pictures is a room hung with thoughts—SIR JOSHUA REYNOLDS

BLESSED are the collectors, for *theirs* are all the beautiful things upon which Time has placed its seal of merit. They cannot dissipate, and which passes from generation to generation, growing with the increment of genius.



Place all the stocks and bonds of a *Morgan* in the balance with his acquisition of objects of art and of books, and which of them conferred the greater satisfaction and greater fame? *But why instance a millionaire? Collecting of some sort is within the means of the humblest of educated wage earners*, and the pleasures and profits of collecting are rather greater when each acquisition represents some degree of sacrifice. *The extensive and expensive art and book collections of the late Robert Hoe did not rank very high. True, he had materials for several collections, but his purchases were apparently without any special aim other than to acquire rare and (therefore) costly items. He bought as a shopkeeper might have done, and probably realized but a small part of the enjoyment in collecting which comes to those who have a more decided purpose to which they remain steadfastly loyal. There is more pleasure in collecting patiently and cautiously than in forcing the pace by command of great wealth.*



Fig. 2.

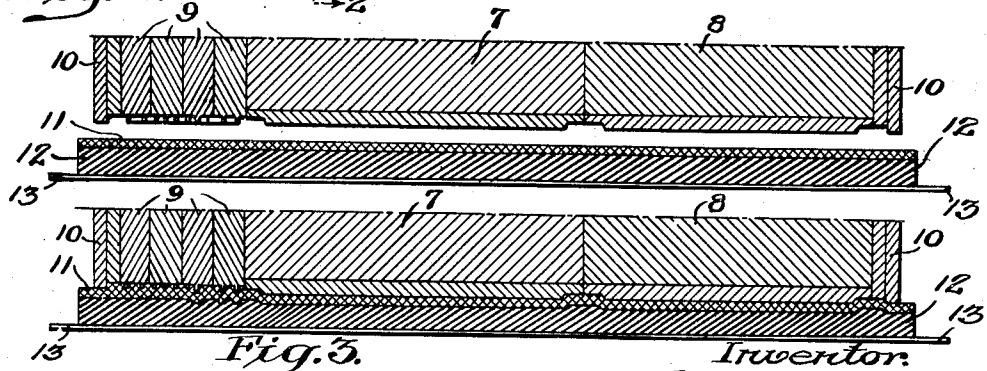


Fig. 3.

Witness.
Walter Chism

Inventor.
Harry M. Blaetz
by
Attorney.

Patented Aug. 19, 1924. 1,505,082

UNITED STATES PATENT OFFICE.

HARRY M. BLAETZ, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS AND BACKING FOR USE IN LEAD MOLDING FOR ELECTROTYPES.

Application filed July 24, 1920. Serial No. 398,760.

To all whom it may concern:

Be it known that I, HARRY M. BLAETZ, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Process and Backing for Use in Lead Molding for Electrotypes, of which the following is a specification.

My invention relates to "lead" molding practiced as a preliminary to the making of electrotypes.

The purpose of my invention is to parallel in lead molding the pressure adjustment automatically secured in wax molding.

A further purpose is to reduce the pressure required in lead molding and to improve the definition secured, by cushioning the lead sheet against a material which will distribute locally in proportion to pressure; with the result that the cushioning material flows from points of high pressure to points of low pressure.

A further purpose is to avoid sliding of the cushion at the edges, by bearers located about the original.

A further purpose is to provide a cushion for the lead, which, under the conditions required by it in preparation for use, shall be "viscous" and sufficiently fluid but shall nevertheless have enough cohesion and firmness to maintain it against other than local redistribution.

A further purpose is to apply an electrically protective coating to the back of the lead sheet by the operation of molding the lead.

I have preferred to explain my invention by reference to a few only of the many materials which may be used, and a discussion of the principles involved, selecting materials which are practical, efficient and reliable and which at the same time show a wide range for choice in the application of the invention. In the illustration I have shown but one form of application though the manner of applying the invention may obviously be varied.

Figure 1 is a reverse facsimile of a printed form including several different kinds of type and plates from which a lead molding may be produced by my invention.

Figure 2 is a fragmentary section of the printer's form by which the print in Figure 1 is produced, corresponding in position to line 2—2 and superposed above a lead sheet and a backing.

Figure 3 is a section corresponding to Figure 2, after the molding operation has been performed.

In the drawing similar numerals indicate like parts.

In the making of electrotypes, lead molding has long been recognized as having many advantages over wax molding, chief among which may be mentioned the freedom from distortion or size variation by reason of temperature changes, the direct transfer to the depositing tanks, avoiding two handlings for building and graphiting, and the cleaner and sharper impression secured.

As lead molding is practiced usually, the original is placed face upward upon the bed of an hydraulic press, a sheet of molding lead approximately forty thousandths of an inch in thickness is placed over it and several thicknesses of newspaper are placed above the lead and between it and the upper platen of the press to act as a cushion.

The press used is much heavier and more expensive than that required for wax molding and the pressure is applied gradually to force the lineaments of the original into the lead by a pressure totalling sometimes more than two thousand tons upon a 22 inch ram; but depending, of course, upon the size of the original and the proportion of solid printing surface which it presents.

The paper used for the cushion backing does not flow from point to point but compresses in position, presenting geometrically increasing resistance ahead of the high surfaces of the original until the necessary reactive pressure has been applied to the low surfaces. The high surfaces of the original thus compress the paper excessively as compared with its low surfaces, causing a wide variation in the distribution of the pressure over the lead surface.

With such a cushion the pressure required for lead molding from any given plate is four or five times that required for wax molding from it. This high pressure has been recognized as objectionable, not only

because of the special character of the press, more expensive and much heavier than the ordinary electrotyping establishment can afford or needs for wax molding, but because it is so destructive of type and ordinary zinc etchings that it is prohibitive as to them, limiting molding of these originals to the wax process, particularly where duplicate impressions are to be made.

These recognized difficulties have confined lead molding to a comparatively few foundries and, even in them, to use with copper or specially prepared hard zinc originals.

The unsatisfactory character of the newspaper cushion has been recognized for many years and various efforts have been made to overcome it. Such materials as felt and rubber blankets and cork have been tried but have proved unsatisfactory. In my judgment they have failed for the reason that they would not flow and because their ranges of resilient compression were exceeded. The materials, however, were crushed so thoroughly as to be incapable of use a second time, and the cost of replacement for each molding operation is excessive.

My cushion and process substitute sluggish fluidity or mobility of a plastic medium for intensive local compression, and equalization of pressures for contrast of pressures. My cushion comprises a material which will flow reasonably under commercial conditions of handling, and under normal pressures such as are used in wax molding. This requires that the cushion shall be sluggishly plastic under pressure, having what I would term viscosity, even if it be not truly viscous, but having sufficient cohesion and firmness to avoid excessive side flow or slding which would injure the copy in lead molding even more than in wax molding. The cushioning material can be retained somewhat against excessive squeezing out under the pressure used by bearers about the form; but with or without bearers it must depend chiefly upon its own inherent firmness to prevent local adjustment of pressure from degenerating into sliding.

The uniformity of reactive pressure thus attained at the back of the lead is comparable with the uniformity of reactive pressure presnted by the wax in wax molding.

Not only do I secure clear definition with low hydralic pressure, but I maintain more nearly uniform thickness of the lead and, by adhesion of the backing to the lead save an additional operation usually required to prevent electro-deposit upon the back of the lead sheet.

I have discovered that among many materials which will serve my purpose electrotyper's wax commonly used for wax molding is suitable for use as a cushion for the lead. It varies greatly in composition. Other materials suggested as possessing the requisite sluggishness in side flow with plasticity or fluidity under pressure are putty, molding clay, soap, tallow, and a considerable variety of other waxes not limited to mineral waxes and, among them, some within and others outside of the paraffin class.

As will be recognized, these different materials will require different treatment in preparation for use. The electrotyper's wax will require the usual care to avoid air bubbles and oil, the temperature and treatment varying with the "mix" of the wax. The molding clay and putty will require moistening with water and oil respectively, and the soap, tallow, etc. should be made with a view to the required degree of viscidity or mouldibility to permit local movement under pressure.

With the disclosure of requisite characteristics and function made herein, those skilled in the art will readily be able to add to this list and to determine from known characteristics or trial the suitability of various other materials.

Whatever the cushioning material used for the backing, it should be placed upon a suitable foundation for convenience in handling, should have sufficient thickness to give ample depth for local flow under pressure and may be retained against mass movement by bearers.

With each of the cushioning materials the surface of the backing should be leveled before use. This may be done by shaving as in the use of electrotyper's wax for molding.

My backing subsequently protects from electrical deposition of metal upon the reverse face of the lead plate.

In Figure 1 I have illustrated a reverse facsimile showing a considerable variety of type, including italics, a zinc etching 5 and a copper plate 6, in order to point out the suitability of my invention to the reproduction of all kinds of matter such as may enter the ordinary printer's form. I can lead-mold from half tones (copper or zinc), zinc etchings, wood cuts and electrotypes, whether blocked on wood or not, from stereotypes and from type.

Though I do not consider it of great importance, on small forms I prefer to reverse the position of the original as compared with the usual lead molding process, placing the form above and the lead sheet below, with the cushioning backing under the lead. By this arrangement I find that I can protect to the best advantage against contact of the backing with the sides of the form or, in the case of thin plate originals, with the opposite platen. With larger forms, however, I prefer to place the lead above the form.

If it be the intention to make more than

one reproduction or to use the zinc etching or copper plate subsequently without remounting, it is desirable that the blocks 7 and 8 upon which they are mounted shall be of metal rather than of wood. The type 9 may be of any variety and the form is outlined by bearers 10 to press upon the lead sheet 11 and prevent squeezing out of the cushion 12 upon foundation 13.

It is desirable that all of the blank spaces and all of the concavities within the printing faces be quite shallow to avoid excessive cupping of the lead sheet at these points and corresponding excessive flow of cushioning material to fill up these concavities. It is to be noted that this equalizing flow would not be from closely adjacent sections only but, if excessive, would require readjustment over a large part of or all of the printing surface.

The parts shown in Figs. 2 and 3 are capable of use within the ordinary hydraulic press, such as is now generally used for wax molding.

In Fig. 2, the parts are shown separated to distinguish sharply between the printing form above and the lead sheet and backing below.

In Fig. 3 the parts are shown in the position assumed when the pressure is on, in which the lead has been forced up within the "low" spaces or concavities of the form and in which the pressure upon the back (under surface) of the lead, as also upon the front (upper surface) of the lead sheet is substantially uniform over the entire surface to be reproduced.

By my process the pressure upon the front and back of the lead is thus equalized over substantially the entire surface, improving the definition with which the finer detail of the original is reproduced, making the reproduction of uniform accuracy and detail throughout the entire surface and bringing the pressure required within the capacity of the ordinary press used in wax molding and available in even the smallest electrotyping foundries throughout the country.

My process and the use of my equalizing plastic backing secure an advantage not previously attainable in the case of under-etched plates and italic type. When attempt is made to mold these in wax, the wax enters the under-etched spaces of the plates and beneath the kerns of the italics with the result that the wax does not part freely from the original and, when the parting is forced, leaves a rough edge along the line of the under-etching and about the kerns.

No type could be moulded satisfactorily by previous lead molding processes and the molding of under-etched plates in lead has previously bent over the edge because of the excessive pressure required. By my lead molding process, the kerns and abrupt edges of italic type and the undercut edges of plates are reproduced in sheer edges in the lead plate without breakage or bending of the surfaces.

When the cushioning backing material selected is electrically insulating and adhesive, as will be the case with most of the materials suitable for use in carrying out my invention, it will adhere to the back of the lead, forming a coating well suited to protect the back from electro-deposition of metal and avoiding the necessity of applying such a protective coating separately. This coating also stiffens the lead sheet so that it is less subject to distortion during transfer to the electro-plating bath.

So far as I have been able to determine, the best material for my purpose is ordinary wax used in the electrotyping industry. These electrotyper's waxes are sometimes of mineral, sometimes of vegetable base, compounded to give desirable results.

With the disclosure herein it will be obvious that many other cushioning materials and ways of carrying out my process will occur to those skilled in the art depending upon the experience and the judgment or whim of the individual as well as the understood needs of the individual foundries or types or work, yet all coming within the spirit and scope of my invention and therefore within the claims thereof.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The process of lead molding which consists in simultaneously pressing the entire surface of a lead sheet placed between the original and a plastic backing, thereby distributing the backing locally as the pressure is applied and equalizing the reactive pressure of the backing over all parts of the lead.

2. The process of lead molding which consists in pressing through an original simultaneously over the surface of a lead sheet while it is supported at the back by a plastic backing, thereby distributing the backing locally as the pressure is applied and equalizing the pressure, and restraining the backing against undue flow about the edges by pressure against the lead outside of the limits of the original to be reproduced.

3. In the process of electrotyping, the steps, which consist in selecting an adhesive backing, electrically non-conducting and firm against normal pressures but plastic under pressure permissible for wax molding, in placing a lead molding sheet over the backing, in pressing an original against the lead simultaneously throughout the extent of the lead to mold the original and to attach the backing as a protection to the lead preparatory to the electroplating.

4. In the art of lead molding for electrotyping purposes, a lead molding sheet and a novel backing which comprises a plastic material adapted to yield locally under pressure and to maintain uniform pressure contact with the back of the lead sheet in combination with means restraining against excessive lateral flow to restrict the flow to local movement.

5. In the art of lead molding for electrotyping purposes, a lead molding sheet and a novel backing which comprises a plastic material having sufficient adhesion to cause it to adhere to the sheet, adapted to yield locally under pressure and to maintain uniform pressure contact with the back of the lead sheet in combination with means restraining against excessive lateral flow by its cohesion and adhesion to the sheet to restrict the flow to local movement.

6. In the art of lead molding the process which consists in utilizing a backing having inherent plasticity and in improving the plasticity temporarily for the molding operation by heating the backing.

7. In the art of electrotyping, a lead molding sheet in combination with a backing therefor, having substantially the consistency of electrotyper's molding wax.

8. In the art of electrotyping, the combination of a lead molding sheet, and a plastic backing for the sheet adapted to flow locally under normal wax molding pressures, and having sufficient cohesion to prevent sliding.

9. In the art of electrotyping, the combination of a lead molding sheet and a plastic backing for the sheet and adapted to adhere to the sheet under pressure and to flow locally under normal wax molding pressures and having sufficient cohesion to prevent sliding.

10. In the art of electrotyping, the combination of an original provided with bearers with which the lead molding sheet is adapted to come into contact and a plastic backing for the lead sheet, the lateral displacement of which backing is restrained by the bearers.

11. In the art of electrotyping, the combination of an original containing type in a form, with which the lead molding sheet is adapted to engage and a backing for the lead sheet which backing is plastic under pressures less than the crushing pressure of the type.

12. In the art of lead molding for electrotyping, the combination of type and a plate in the same form, with both of which the lead molding sheet is adapted to come into contact, and pressure-equalizing backing for the lead progressively equalizing the reactive pressure as the operating pressure is applied.

HARRY M. BLAETZ.