Dec. 22, 1953 W. BAUMRUCKER, JR 2,663,251

STEREOTYPE MOLDING

Filed June 2, 1950 2 Sheets-Sheet 1

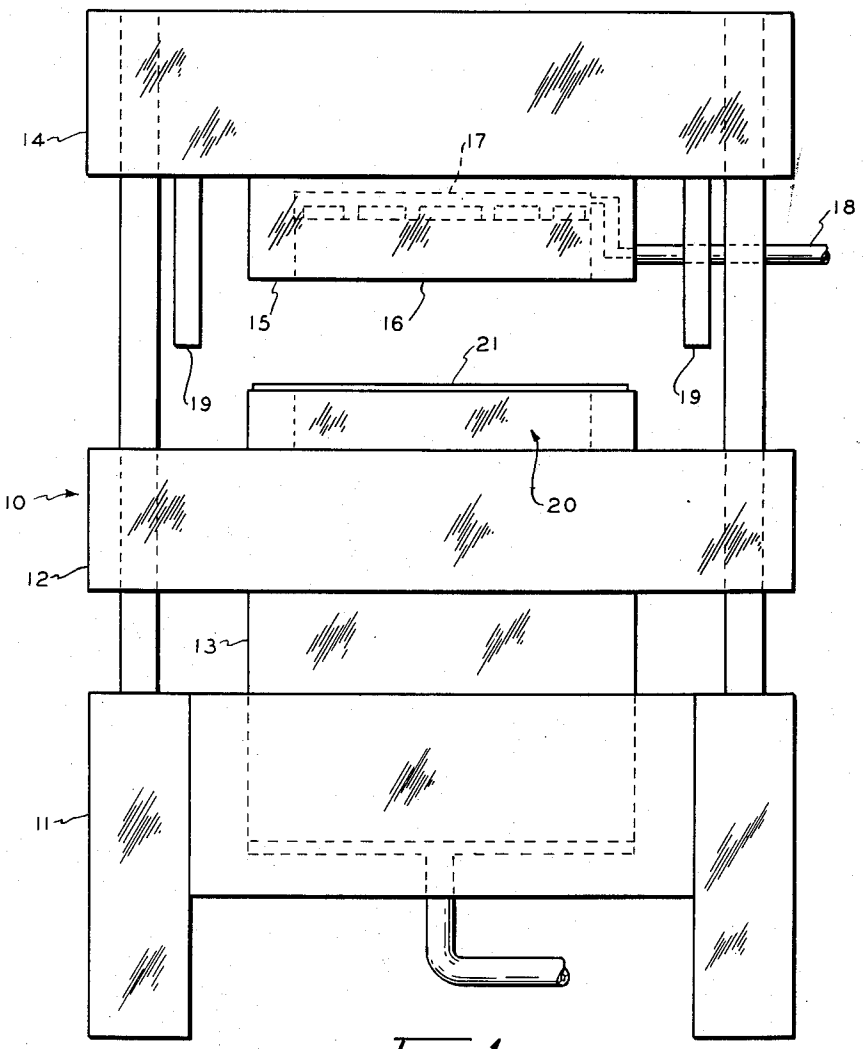



Fig. 1.

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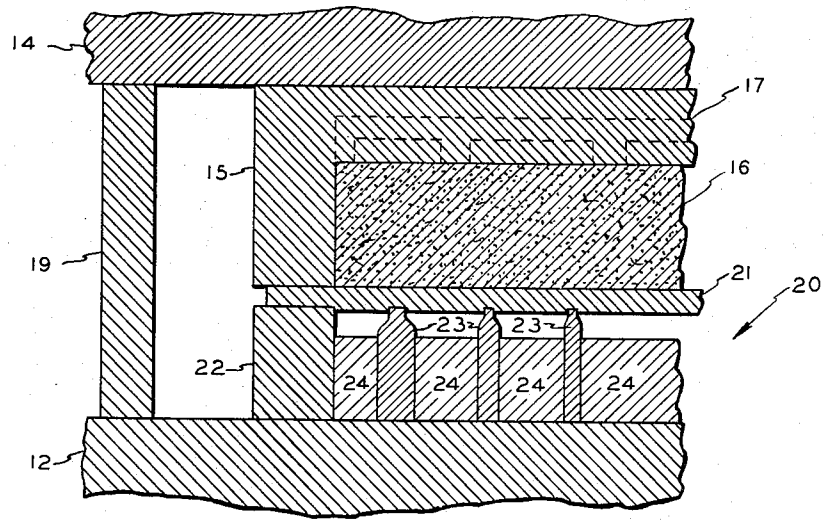



Fig. 2.

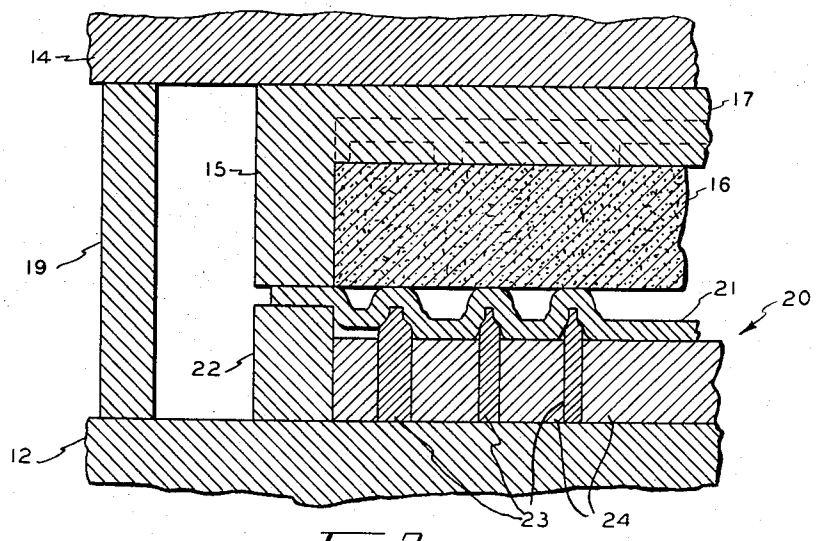



Fig. 3.

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## STEREOTYPE MOLDING

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4 Claims. (Cl. 101—17)

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This invention relates to an improved method and apparatus for molding matrices or mats for the production of stereotype plates such as are used in newspaper and other printing processes.

These mats are made by pressing a flong, a specially prepared sheet of papier-mâché or other moldable material into the locked-up page form comprising type and engravings or whatever might be needed in the area to be reproduced. The image of the page form is impressed upon the flong, which when dry, is used as a type metal mold, for forming duplicate printing plates similar to the original page form in either flat or curved form.

The quality of the printed matter reproduced by the stereotyping process is in the first instance dependent upon the quality of the image impressed into the flong. The type characters must be clear and sharp and where half-tone work is involved, it becomes essential that the engraving be impressed smoothly and deeply; further, the flong must be depressed to a greater depth between lines of type, in the bowls of large letters and in open spaces in the form to prevent such areas from printing.

The current practice in the production of stereotype mats is to place over the damp flong blankets of some resilient material, such as a flexible cork composition sheet about ⅜" thick, and then to apply pressure to the back of the molding blanket. The printing surface of the type and engravings is impressed into the face of the flong by compression of the flong, so that the thickness of the flong above a printing area is less than that of the uncompressed mat. Between lines of type and in the bowls of large letters where greater depth is required than can be obtained by compressing the mat, this is obtained to some extent by the action of resilient molding blanket pressing the flong down into those areas.

It can be readily seen that in employing the above described process, the variations of unit pressure due to variations in area being impressed cause undesirable variations in penetration of the printing areas into the flong. This difficulty becomes more pronounced when the page form has large areas of solid matter on one side and substantially none on the other. Another inherent difficulty in processes and molding apparatus requiring blanketing of the flong is that no single blanket is of the correct thickness and resilience for all plates or for all areas in a single plate.

Molding apparatus employing fluid or mechanical pressure without the use of molding blankets have been proposed to overcome the difficulty in

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pressing the stereotype mat into the bowls of letters and between lines of type but only at the sacrifice of the clarity of the impressed printing areas.

It is, therefore, the principal object of the invention to provide a method and apparatus for molding stereotype mats having clear, sharp printing areas, smooth, deep half-tone impressions, and the required depth between lines of type and in open areas.

A further object of the invention is to provide means for molding such a matrix without the use of molding blankets.

Another object is to provide a method of molding stereotype mats which will substantially eliminate eccentric press loadings and the tendency of the matrix to be impressed unevenly.

These and other objects and advantages of the invention will be apparent from the following description of the invention.

It has been found that highly satisfactory stereotype mats of hitherto unequaled quality may be molded from locked-up page forms using standard papier-mâché or sulphite pulp flongs, or from plastic sheets such as thermoplastic vinyl resins for use as electrotype molds. The method of the invention comprises the following steps in general:

1. Placing a flong upon the chase with the type and engravings locked-up;

2. Impressing into the flong the areas to be printed in the page form to a uniform predetermined penetration of about .006 to .012 inch, but preferably about .010 inch, by means of a substantially flat platen;

3. While thus pressed, depressing the non-printing areas by means of fluid pressure of less force than the type impressing force of step 2.

The apparatus for accomplishing the above process generally comprises a press having a lower platen to support the chase with the locked-up page form, and the stereotype mat, and an upper platen providing means for applying a predetermined rigid or inelastic pressure and a fluid pressure of less force to the surface of the stereotype mat. The press may be of any well known type such as a hydraulic, toggle, or screw press provided with mechanical or hydraulic stops or bearers to limit to a predetermined amount the closing movement or the closing force of the press, either directly or indirectly, such as by limiting the travel of the press platens. The means providing the fluid pressure to the surface of the mat may include a rigid porous platen connected to a supply of pressure fluid or a heated

platen to generate a gaseous pressure from a liquid supplied between the platen and the mat or from a liquid applied to or contained within the heated platen. It has been found that satisfactory porous platens may be provided by drilling numerous fine holes in a conventional rigid platen, by compressing a number of layers of finely woven wire mesh into a rigid platen, or by sinter molding a porous platen of iron, steel or other metals.

The invention will be more particularly described by way of example with reference to a hydraulic press employing a porous platen for molding paper mats from conventional page forms, as illustrated in the drawings, in which:

Fig. 1 is a diagrammatic view in elevation of a hydraulic press adapted to the process of the invention;

Fig. 2 is an enlarged fragmentary view of a section of the press shown in Fig. 1 of the drawings during the initial molding step; and

Fig. 3 shows the press section illustrated in Fig. 2 during the final molding step.

With reference to the drawings 10 is a vertical hydraulic press having an upward-acting press platen. The press comprises a base 11, a lower press platen 12, a ram 13, and a fixed upper press platen 14. Secured to the stationary upper platen by means of a casing or frame 15 is a porous platen 16 and a gas manifold 17 provided with a pressure fluid conduit 18 connected at the other end to a source of pressure fluid, not shown in the drawings. 19 are rigid stops or bearers which are also secured to the under surface of the upper press platen 14 and limit the permissible upward travel of the lower press platen 12.

On the lower press platen is shown the locked-up page form 20 containing the type and engravings to be reproduced in the stereotype mat 21. The details of the form are more clearly shown in Figs. 2 and 3 of the drawings, and comprise the chase 22, type 23 and type furniture 24.

Suitable guiding members may be provided upon the lower press platen to facilitate the positioning of the page form directly below the porous upper platen.

In operation, the page form is positioned beneath the upper platen and a moistened flong is placed over the surface of the type and engravings. It is preferable that the flong be large enough to extend over at least a portion of the chase on all sides of the form. The press is then closed forcing the lower platen upwardly against the press stops or bearers 19, which automatically parallels the upper and lower press platens. When the press is closed to the bearers the details of engravings and the type faces in the page form are impressed into the surface of the flong 21, and a fluid-tight seal is established between the chase 22 and the porous platen casing 15, the flong serving as a gasket as is clearly shown in Figs. 2 and 3 of drawings.

The depth of penetration of the printing areas is controlled by bearers 19 which prevent the press platens from closing beyond a predetermined amount. As hereinbefore described, the depth of the impression formed in the flong by the printing areas should be of a uniform predetermined penetration of about .006 to .012 inch and preferably about .010 inch. Following the initial impression by the press platens, fluid pressure is introduced by means of suitable valves and pressure regulators into conduit 18, and manifold 17, from which the pressure fluid is forced through the porous platen 16 and against



the back surface of the flong 21. The pressure fluid forces the flexible flong into the larger open areas of the form of type and engravings, creating the deep depressions in the mat which prevent the open areas from printing. The pressure of the pressure fluid is of less force than the type impressing force created by the closed press platens. Keeping the force of the pressure fluid less than the inelastic force of the press platens is an important feature of the invention as it provides the means for obtaining the necessary depth of the non-printing areas without affecting the initial impression of the printing areas into the flong. If the force of the fluid pressure acting against the back surface of the flong were greater than the initial inelastic force, the printing areas would be forced deeper into the flong in proportion to the amount of printing areas in a given plate area, resulting in undesired variations in the depth of impressions in the stereotype mat.

In general, the desired impression of the printing areas is obtained when the inelastic or rigid pressure created by the press platens is in the range of about 1200 to about 1500 pounds per square inch. Under these conditions, it has been found that the fluid pressure effective to depress the non-printing areas to be about 90 to about 250 pounds per square inch. When steam is employed as the fluid pressure, the lower pressure has been found to be more advantageous, while if dry air is used to depress the non-printing areas, pressures of about 250 lbs. per square inch have produced very satisfactory stereotype mats.

To provide an effective seal against leakage of pressure fluid from around the chase without impressing the entire chase into the mat, sealing means surrounding the chase, or as part of the chase or of the bearers may be provided. For example, a rubber gasket secured to the periphery of casing 15, or a complete ring of type-high material around the page form will, when the press is closed, effectively seal the edges of the flong between the upper platen and the porous plate. Less total pressure is required when such a sealing means is provided than when the chase itself is utilized to form the seal.

As hereinbefore stated, the pressure fluid employed in the final molding step need not be from a source outside of the molding press, but may be developed within a heated porous platen or developed by a heated solid upper press platen from a liquid supplied between the platen and the flong. It has been found that when the pressure fluid is aqueous in nature, it is preferable to provide means to prevent the flong from adsorbing an excess of moisture. This may be accomplished by the provision of a thin rubber or other non-permeable elastic membrane, positioned between the upper press platen and the mat to be molded, or the back surface of the mat may be coated with wax or other moisture resistant substance which would prevent undesirable penetration of moisture into the mat.

From the foregoing description, it will be seen that the present invention provides a method and apparatus for molding stereotype mats having clear, sharp printing areas, and the required depth between line of type and in the bowls of large letters, whereby the aims, objects and advantages of the invention are fully accomplished.

It will be evident that various modifications may be made in the construction of the molding apparatus and in particular in the form of the upper press platen. The process of the invention

is not limited to the molding of stereotype mats but it may be employed in deep molding processes using non-planar press platens such as for molding papier-mâché masks and containers.

I claim:

1. A method of molding irregular shaped objects comprising placing a sheet of molding material upon a form to be reproduced, applying to the back of said sheet an inelastic pressure to form therein substantially the complete impression of irregularities in the form to be reproduced, and while so pressed subjecting the back of the sheet to fluid pressure of less force than the inelastic impressing force to depress the sheet into the larger open areas of the irregularities in the form to be reproduced.

2. A method of molding a matrix comprising placing a flong upon a page form to be reproduced, applying to the back of said flong an inelastic pressure to form therein substantially the complete impression of the printing surface in the page form, and while so pressed subjecting the flong to a fluid pressure of less force than the inelastic impressing force to depress the flong into the non-printing areas of the form.

3. A method of molding a stereotype mat comprising, placing a flong upon a page form to be reproduced, applying to the flong an inelastic pressure to form therein substantially the complete impression of the printing surface in the



page form by means of a substantially flat platen, and while so pressed subjecting the flong to a fluid pressure of less force than the inelastic impressing force to depress the flong into the non-printing areas of the form.

4. A method of molding a stereotype mat comprising, placing a flong upon a page form to be reproduced, applying to the back of the flong an inelastic pressure by means of a substantially flat porous platen to impress the printing areas in the page form into the flong to a substantially uniform penetration of about .006 to about .012 inch, and while so pressed subjecting the flong to a fluid pressure applied to the back of the porous platen of less force than the inelastic impressing force, to depress the flong into the non-printing areas of the flong.

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