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R. R. MYERS, JR

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METHOD OF PRODUCING FLAT PRINTING PLATES

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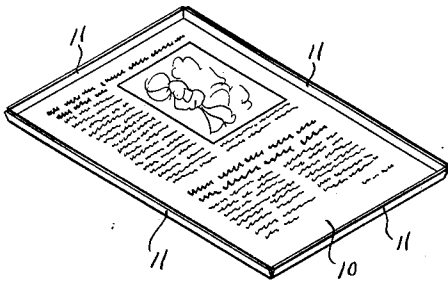


Fig. 1.

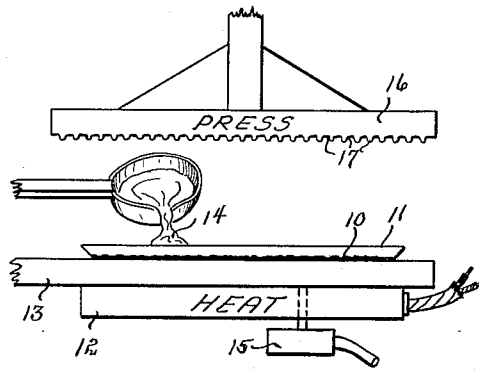


Fig. 2.

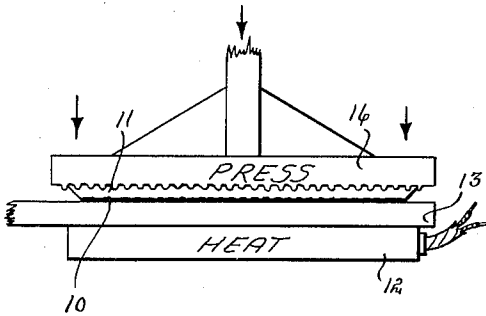


Fig. 3.

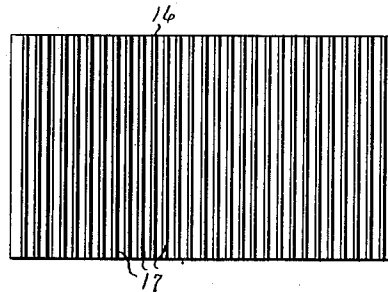


Fig. 4.

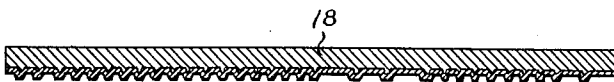


Fig. 5.

Inventor
Robert R. Myers, Jr.

Witness

Merle A. Bjork

by M. Talbert Dick
Attorney

UNITED STATES PATENT OFFICE

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METHOD OF PRODUCING FLAT PRINTING PLATES

Robert R. Myers, Jr., Des Moines, Iowa, assignor
to Monomelt Company, Incorporated, Minne-
apolis, Minn., a corporation of Minnesota

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1

The principal object of my invention is to provide a method of producing flat printing plates without appreciable distortion, thereby making for printing fidelity and accurate color registry in multi-color printing.

A further object of this invention is to provide a method of making flat printing plates that eliminates the placement of the shell in a holding pan prior to the pouring of the molten metallic backing.

A still further object of my invention is to provide a method of making flat printing plates that presses the molten backing material into the shell, thereby not only properly filling out the shell and eliminating air bubbles, but producing a pressure cast plate.

A still further object of my invention is to provide a method that produces a flat printing plate economically, quickly, and easily.

A further object of my invention is to eliminate any possibility of the molten backing material running under the printing shell during the backing phase.

A still further object of this invention is to provide a method of making printing plates that eliminates much hand work, reduces the time element, and produces printing plates of uniform thickness.

These and other objects will be apparent to those skilled in the art.

My invention consists in the method or process, whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of a printing shell with the marginal edges bent upwardly to form a tray.

Fig. 2 is a diagrammatical view of the heating of the shell, the pouring of molten backing material into the tray, and the mechanical agitation of the same.

Fig. 3 is a diagrammatical view showing the compressing of the backing material onto the printing shell by the use of a press or like.

Fig. 4 is a bottom view of the face of the press.

Fig. 5 is a cross-sectional view of the finished printing plate after it has been trimmed.

The present method of making flat printing plates is to take the printing shell and place it in a pan, after which the molten backing material is poured into the pan and over the shell. Much skill and time is necessary in this part of the operation. It is almost impossible to prevent some of the backing metal from running be-

2

tween the printing shell and the inside bottom of the pan. This is due to the fact that the thin printing shells are usually warped and inasmuch as they are made of lighter material than the

molten backing material, they have a tendency to float or rise upwardly in the molten mass. Skilled operators usually try to hold the shell on the bottom of the tray by a stick or like, but as above noted, a certain amount of the backing plate will

always run under the shell. It is for this reason that the face of the printing shell before it is placed in the pan is chalked or otherwise coated to prevent the backing material sticking to the

face of the shell even though it does run under the same. One of the most time consuming phases is the pre-heating of the heavy pans before the introduction of the backing material. This not only takes time and heat units, but such

heated pans and the backing material take a considerable time to cool. After the printing plate has been cooled it is necessary to remove it from the pan and trim it. Another disadvantage of this present method is that there is a great waste

in the backing material which must be trimmed from around the edges of the shell. Also, besides trimming, any backing material on the face of the plate must be removed and the face of the plate cleaned of chalk or like material placed thereon. A further disadvantage of the present

method of making plates is that the thickness of the backing material is not uniform and, of course, must be machine thinned to the proper thickness. Even, however, regardless of the skill and time taken, such resultant printing plates are

defective and must be re-worked to eliminate "highs" and "lows" and other imperfections. Two reasons are the main causes for these troubles, i. e., the thin printing shell has a tendency to warp before, during, and after the heated back-

ing material is poured onto it, and with only the force of gravity to spread the molten backing material, the backing material develops stresses and strains, internal bubbles, varying densities, and an uneven top surface. I have overcome such

problems, as will hereinafter be appreciated.

In Fig. 1, I use the numeral 10 to designate an electroplate shell. The method of obtaining such a printing shell is well known in the art and is not a part of this invention. Although I have particularly designated the numeral 10 as an electroplate shell, it is obvious that this printing shell may be of any kind and in fact, can be an ordinary matrix. The first step in my process is to bend the marginal edges 11 of the member 10 upwardly to provide a tray. If in bending the

corners, or rim edge is not of uniform height, they may be trimmed to provide a tray as shown in Fig. 1. While it is desirable to have the corners of the tray as tight as possible, any molten metal poured into the tray will congeal at the corner slit or opening and seal the same. By this step in my process, I not only strengthen the shell, but eliminate the hereinbefore necessary placing of the shell in a pan prior to the application of the molten backing material. The second step in my process is the pre-heating of the tray-shaped shell. This may be accomplished by any suitable means such as gas or oil heat, or by an electric heating plate 12, as shown in Fig. 2. In this figure, I show the tray resting on a base 13 and with the heating plate below the base. While under certain conditions, this preheating of the tray may be dispensed with, I find that by pre-heating the tray shell it will be more receptive to the receiving of the backing material. After the shell has been pre-heated so that the molten material will run properly into all of the back crevices of the shell, I pour the molten backing material 14 into the tray shell. This filling of the tray shell with molten backing material may be considered as the third step. The fourth step consists in the agitating of the tray shell with the molten metal therein by any suitable means such as an air plunger agitator 15. Also, under certain circumstances, it is possible to dispense with this fourth step in the process. The fifth step is the bringing of a press head 16 downwardly on the top of the shell tray containing the molten backing material with the press head of a dimension greater than the dimension of the tray so as to overlap and extend beyond the periphery of the tray as shown in the drawings. This press 16 will be cold relative to the molten backing material and the first action will be for the press to chill and solidify the upper surface of the molten material in the tray. This result will seal the upper part of the filled tray shell and as the press continues downwardly, the molten backing material on the top of the shell will be compressed and forced downwardly on the shell, thereby properly filling all of the crevices of the printing shell. Obviously, this pressure casting of a printing plate will not only assure successful backing of the shell, but will force the shell downwardly into contact at all points with the flat upper surface of the base 13. This means that the bottom printing surface of the finished plate will be level at all required points and that "highs" and "lows" will be substantially eliminated. Even though the shell may be slightly warped prior to the lowering of the press, it will be definitely straightened and properly formed in a level plane when the press is lowered onto the shell and molten material. This substantially perfect forming of a printing plate eliminates costly and time-consuming hand labor. Another result of such pressure casting is that the upper surface of the finished printing plate will be that of the flat press and, therefore, it will be unnecessary to refinish the top of the backing material after it has cooled. If desired the face of the press may have corrugations 17, as shown in Fig. 4, in order that the finished plate will also have top corrugations to add to its strength. With the press in contact with the backing material it all will quickly cool and solidify, thereby greatly speeding up the time of making printing plates. As soon as the backing material has solidified, the press is elevated and the printing plate removed for trimming to produce a printing plate 18, as shown in Fig. 5. If

the member 10 is a matrix, instead of a printing shell, the matrix is removed as soon as the material 14 cools.

Briefly, the main phases of my process are the bending of the printing shell or like upwardly at its outer edges, the pouring of molten backing material into the tray thus formed, and the application of a press to the surface of the molten material to compress the same and solidify the same by lowering first its surface temperature. By regulating the distance the press closes, all of the printing plates made thereby will be of the desired and uniform thickness. By turning up the outer edges of the shell the present method of using a pan and the pre-heating of the same is completely eliminated. Furthermore, there is no possibility of the backing material running under the shell and adhering to the face of the shell. My method, therefore, eliminates the coating of the face of the shell with a chalk substance or like. Furthermore, the backing plate material is placed in my tray shell and therefore the printing shell cannot float in the backing material. By my method, the press in a few seconds will solidify the backing plate and the present long cooling period is completely eliminated. Furthermore, by pressure casting the plate, as herein described, the backing material after cooled, will be of the proper density and there will be a minimum waste of the backing material when the plate is trimmed at its edges. Under certain circumstances, such as when the printing shell is exceptionally fragile and thin, it may be desirable to coat the face of the shell with clay or like material before it is subjected to the press. This clay or like material will fill the blank spaces between the reliefs of the printing shell and will prevent thereby the heavy backing material or the action of the press from forcing these blank spaces downwardly onto the surface of the base of the press. Obviously, it is desirable that these blank spaces remain in elevated positions to provide the required printing surface or characters of the plate. The clay or like should not cover the relief indicia of the shell, but only fill the vacant spaces. If such a substance is used on the face of the shell, it should be removed by water or like after the plate has cooled.

Some changes may be made in my process for producing flat printing plates without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. The method of producing flat printing plates, comprising the taking of a flat bendable sheet member having relief indicia thereon and the bending of its outer marginal edges upwardly to form a tray, the placement of the tray on a flat supporting press surface, the introduction of a molten material into the tray with its bent edges acting as the sole edge confining means for the molten material, the subjection of the top of the tray and its molten contents to the downward pressing action of a press head of a press, with the press head surface having dimensions greater than the dimensions of the tray so as to overlap and confine the entire tray, and the removal of the press head from contact with the tray and material therein after the material has solidified.

5

2. The method of producing flat printing plates, comprising the taking of a flat bendable sheet member having relief indicia thereon and the bending of its outer marginal edges upwardly to form a tray, the introduction of a molten material into the tray with its bent edges acting as the sole edge confining means for the molten material, the subjection of the top of the tray and its molten contents to the downward pressing action of a press head of a press, with the press head surface having dimensions greater than the dimensions of the tray so as to overlap and confine the entire tray, and the removal of the press head from contact with the tray and material therein after the material has solidified.

3. The method of producing flat printing plates, comprising the taking of a flat bendable sheet member having relief indicia thereon and the bending of its outer marginal edges upwardly to form a tray, the placement of the tray on a flat supporting press surface, the introduction of a solidifiable material into the tray with its bent edges acting as the sole edge confining means for the solidifiable material, the subjection of the

6

top of the tray and its solidifiable contents to the downward pressing action of a press head of a press, with the press head surface having dimensions greater than the dimensions of the tray so as to overlap and confine the entire tray, and the removal of the press head from contact with the tray and material therein after the material has solidified.

ROBERT R. MEYERS, JR.

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