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L. CATES

PROCESS OF MAKING MOLDS FOR PRODUCING PRINTING PLATES

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Fig. 1.

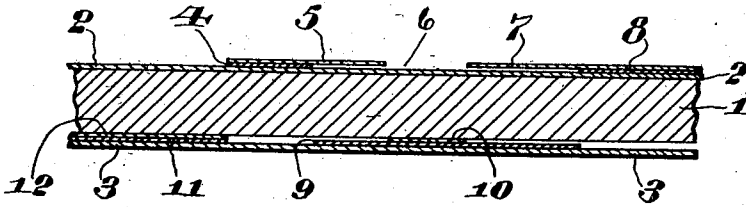


Fig. 2.

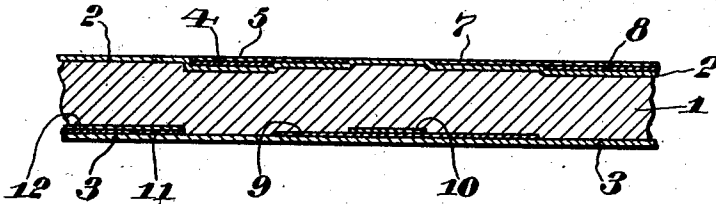
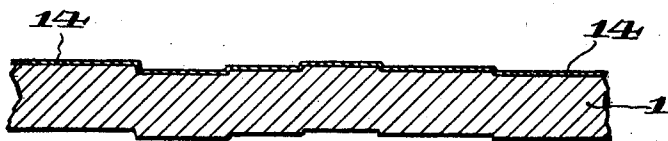


Fig. 3.



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UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING MOLDS FOR PRODUCING PRINTING PLATES.

Application filed March 18, 1922. Serial No. 544,812.

To all whom it may concern:

Be it known that I, LAFAYETTE CATES, a citizen of the United States, and a resident of Drexel Hill, in the county of Delaware and State of Pennsylvania, have invented an Improvement in Processes of Making Molds for Producing Printing Plates, of which the following is a specification.

My invention relates to the process of producing printing plates, particularly those for artistic plate printing known as "half-tone," of the character in which the "make-ready" is permanently produced in the faces thereof. In the manufacture of printing plates of this character the first step is the production of a photo engraved plate produced by some one of the etching processes familiar to the photo engraver. Such a plate having been produced, a mold is taken of the impressions upon the face thereof; that is, of the depressions and elevations on the face, the said depressions and elevations in the plate forming elevations and depressions in the face of the mold. Any suitable material may be employed for the making of this mold, such as lead or a suitable wax, the former being most generally used. Heretofore the practise has been to form upon the face of this mold by electrolytic deposition a thin plate or sheet of copper, the elevations and depressions in the face thereof being exactly the reverse of the elevations and depressions in the face of the said mold. The plates thus produced have been backed up heretofore by a suitable alloy usually consisting of lead, tin and antimony and thereafter subjected to certain treatments, such as are described in the Letters Patent of the United States to McKee, No. 857,531, in order to bring them to the condition desired before placing them in a printing press and employing them for printing or reproduction purposes. Such treatment of the final plates has been found to be not only expensive but unsatisfactory in the results accomplished.

The principal object of this invention is to improve the art of producing such printing plates so that, as stripped or removed from the mold, they are in condition without further treatment except for the backing to be applied thereto to be used for printing or reproduction purposes.

The specific object of the invention is to subject the mold, whether it be of lead or

some other suitable material, to such treatment that its front or printing face is of such character or possesses such characteristics that the printing plates formed upon the faces thereof may be employed for printing or reproduction purposes without any intervening treatment except the placing of backs thereon in known manner.

In the carrying out of the process embodying my invention, a mold is first taken or made of the face of a photo engraved plate which mold consists of a sheet of suitable material such as lead. This mold is produced by superposing the said moldable sheet upon a photo engraved plate and subjecting the sheet and plate to pressure in a cold state between two flat surfaces to cause the face of the soft moldable material to conform to the elevations and depressions in the face of said plate. Thereafter by the employment of what I shall term "matrices" the said mold is treated so that upon the removal of a plate or shell formed thereon by electrolytic deposition, or otherwise, the face of such plate or shell is of such character that, when backed up to form a printing plate, it may be employed for printing or reproduction purposes without further treatment, shaping or alteration in any manner whatsoever of its face. That is to say, the elevations and depressions therein are of such relation to each other that solid, intermediate and light shades possessing the relative depths of shade may be produced without intervening treatment of the face of the plate. In order that an electroplate or shell as it is called produced by electrolytic deposition upon the face of the mold may be of a character to produce the result desired, proof sheets are printed from the photo engraved plate to which reference has heretofore been made. By using a number of these sheets and cutting out portions thereof and building up upon other portions, matrices may be produced which, when placed upon opposite sides of the mold and the whole subjected to pressure, cause alteration in the face of the mold as hereinbefore indicated.

In order to facilitate a detailed description of the process and in order that the manner of the use of the said matrices may be readily understood reference may be had to the accompanying drawing forming a part of the specification and in which—

Fig. 1 is a transverse sectional view of a

mold with a top and bottom matrix in contact with but not impressed upon the front or face and the rear or back-side of the mold sheet;

5 Fig. 2 is a similar view showing the matrices and the mold after the same have been subjected to pressure and the opposite sides of the said mold have been caused to conform to the configuration of the adjacent contacting surfaces of the matrices; and

10 Fig. 3 is a transverse sectional view of a portion of a mold with a thin electro-type metal plate or shell thereon, said sheet having been formed by electrolytic deposition, in known manner.

Referring to the drawing: 1 designates the mold sheet, the top surface of which is provided with elevations and depressions (not shown) produced by previous pressure of the mold upon the face of a photo-engraved plate.

25 In Figs. 1 and 2 the matrices, the top one of which is sometimes referred to as an "overlay" while the bottom one of which is also referred to and known as a "reverse underlay," are shown in position upon opposite sides of the mold sheet.

30 Proof sheets having been taken from the photo-engraved plate the workman or person having charge of the preparation of the printing plate determines whether or not there is the desired differentiation between the solids, intermediates and high lights. If there is not he then proceeds to prepare the matrices so as to develop or alter the face of the mold so that a printing plate produced therefrom will contain in its face the permanent "make-ready" necessary to produce a half-tone or other reproduction having the differentiation of tone or shading desired. If it is desired to cause the solids of the half-tone or other reproduction to be brought out more definitely the workman will cut out portions of one or more proof sheets, depending upon the change to be effected in the mold, conforming in outline to the areas of the solid and will place the pieces thus secured in the proper position upon a base or carrying sheet of the top matrix. The bottom matrix will be provided with spaces into which the metal displaced by these pieces upon the top matrix sheet may be projected. Likewise, if it is desired that a portion of the reproduced work shall be of lighter shade than in the proof the top or impression surface of the mold should be projected upwardly. This will be effected by placing a projection of the required area and height upon the base or carrying sheet of the bottom matrix. At the same time a space will be provided in the top matrix for the reception of the metal of the mold displaced by the projection upon the bottom matrix. It

will thus be seen that by varying the heights of the elevations with respect to the bases of the respective matrices the elevations and depressions in the face of the mold may be controlled to the desired exactness so as to produce solid, intermediate and high light tones of the exact character desired.

70 Referring now to the matrices, 2 and 3 respectively designate what I have termed the base or carrying portions of the top and bottom matrices. It will be observed that the base 2 of the top matrix is provided with the overlays 4 and 5, the former being of less area than the latter. Each of these consists of a single thickness of matrix paper and they are secured upon the top surface of the continuous base sheet 2. It will be noted that a portion of the top overlay 5 extends beyond the bottom overlay 4 and that in consequence the opposing portion of the surface of the mold 1 is depressed a less distance than the portion of such surface opposite the overlay 4. There are no overlays or projections upon certain portions of the base sheet 2 and in consequence the portions of the surface of the mold sheet corresponding to those portions or regions after compression between the matrices project above the surrounding portions of the surface thereof. A considerable distance to the right of the overlay 5 there is an overlay 7 and still further to the right there is a second overlay sheet 8 interposed between the right hand portion of the overlay 7 and a portion of the base sheet 2.

100 Referring now to the bottom matrix it will be observed that the depressions and elevations therein are exactly the reverse of the depressions and elevations of the top matrix; for instance, opposing the overlays 4 and 5 there is a depression within the bottom matrix of exactly the same depth as the combined height of the two overlay sheets. Opposite the overlay sheet 5 to the right of the overlay sheet 4 there is a sheet 9 upon the base 3 of the bottom matrix and upon the sheet 9 in opposing relation to the region 6 of the top matrix there is an additional sheet 10 which is adapted to cause the displacement of the metal of the mold to fill the depression in the top matrix corresponding to the region 6. It will be noted that at the right hand side of Figs. 1 and 2 of the drawing there are no overlay sheets upon the base sheet 3 and that opposed to such portion are the overlay 8 and a portion of the overlay 7 and in addition a portion of the base sheet 2 of the top matrix. Except that the depressions and elevations in the matrices are reversed, a like condition exists at the left hand side of Figs. 1 and 2. At the left hand side of these figures the bottom matrix comprises the elevation consisting of the combined thickness of the sheets 11 and 12 which are secured

upon the top side of the base sheet 3. The said sheets 11 and 12 are in opposed relation to a portion of the base sheet 2 of the top matrix.

5 In the construction of the matrices as shown the built-up portions of the top matrix are located above the base sheet 2, the latter being in contact with the face of the mold while in the bottom matrix the built-up portions thereof are situated intermediate the base sheet 3 and the bottom of the mold sheet 1, but obviously this arrangement may be reversed. It is to be understood that my invention is not limited or restricted by the construction of the matrices and that the matrices as disclosed are merely for the purpose of facilitating the description of the invention and an understanding of the same.

20 It will be seen that in the carrying out of my process the metal of the mold is displaced vertically; that is, in directions normal to the plane thereof and that the result of compressing the mold sheet between the matrices is to alter the relative positions of different portions of the face of the sheet containing the impressions which it is desired to reproduce. By thus altering the relative positions of different portions of the face of the mold sheet I am enabled to control the gradations of the tones or shades of the different portions of the half-tone or other reproduction which is ultimately produced by the employment of a printing plate the printing surface of which is the reverse of the face of the mold. The depth of the depressions and the height of the elevations may be varied by varying the number of overlay or matrix sheets upon the base sheets each of which is two thousandths (2/1000) of an inch in thickness.

In Fig. 3 of the drawing I have shown a thin metal plate or shell 14 upon the face of the lead mold which plate or shell has been formed by electrolytic deposition. The face of this plate, when properly backed up, constitutes the printing surface of the printing plate. It will be observed that the portions thereof which correspond to the depressions in the face of the mold sheet project beyond other portions of the plate; that other portions of the said plate which occupy depressions of less depth occupy a lower plane; and that still other portions thereof formed upon projecting portions of the said mold sheet, as the portion at 6, occupy a still lower plane. In the employment of such printing plate it will be understood that the faces of the outermost portions thereof produce solid colors, that the portion or portions of the plate occupying intermediate planes produce intermediate tones or shades and that the other or lowest portions of the plate produce the lightest portion of the matter reproduced or, as it

is generally described, an area or areas of high light.

A printing plate or shell produced as above described embodies permanently therein the necessary "make-ready" and when the same has been backed up in known manner, the printing plate thus produced may be placed in position in a printing press and employed for printing without the necessity of any further treatment to change the conformation of the printing surface or face.

Although I have described my invention as applied to the production of an electrotype printing plate it will be understood that the principle thereof may be employed in the production of stereotype plates.

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

1. The process of producing printing plates embodying permanent "make-ready" in the face thereof which comprises as steps therein the compression of a sheet of moldable material against the engraved face of a photo-engraved plate to obtain an impression therefrom upon the face of said sheet of moldable material and thereafter effecting relative depression and elevation of different portions of said face of the mold sheet to conform to the required "make-ready" to be embodied within the finished printing plate and thereafter forming a printing plate upon said face.

2. The process of producing printing plates embodying permanent "make-ready" in the face thereof which comprises as steps therein the compression of a mold sheet of relatively soft material against the engraved face of an engraved plate to obtain an impression therefrom and thereafter subjecting said sheet to pressure to effect displacement of different portions thereof in different directions normal to the plane of said sheet to produce the required variation in the configuration of the impression surface thereof, for the purpose described.

3. The process of producing printing plates embodying permanent "make-ready" in the face thereof which comprises as steps therein the compression of a mold sheet between oppositely disposed matrices to transfer to the impression face of the said mold a configuration conforming to the matrix in contact with such face and thereafter forming a printing plate upon said impression face.

4. The process of treating a mold sheet having on one face thereof impressions taken from an engraved plate, which sheet is employed for the production of a shell or printing plate, which process comprises the compression of said sheet to alter the planes of the depressed and elevated portions of the impression surface thereof so as to embody

therein permanent "make-ready," substantially as and for the purpose described.

5 5. The process of treating a mold sheet of moldable material, one face of which comprises elevations and depressions the said face being an impression face, which comprises the placing of matrices upon the opposite sides thereof which matrices are reverse, the one with respect to the other, 10 and thereafter subjecting the said mold and matrices to compression to alter selected elevations and depressions, for the purpose described.

15 6. The process of producing a printing plate embodying permanent "make-ready" in the impression face thereof which con-

sists in the pressing of a mold sheet of relatively soft material against the printing face of an engraved plate to obtain an impression therefrom and thereafter displac- 20 ing the material of said sheet in directions normal to the impression face thereof to such extent as may be necessary to cause the same to embody the required "make-ready" which it is desired to impart to and cause 25 to be embodied in the face of a printing plate produced upon said mold sheet.

In testimony that I claim the foregoing as my invention, I have hereunto signed my name this 17th day of March, A. D., 1922.

LAFAYETTE CATES.