April 3, 1945. G. E. SOJKA 2,373,060

DIE STAMPING

Filed June 29, 1942

Fig. 1.

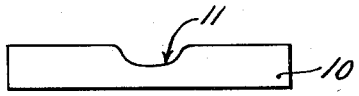


Fig. 2.



Fig. 3.



Fig. 4.

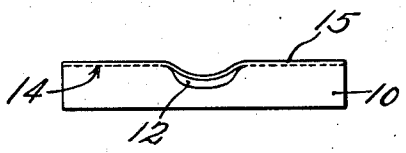


Fig. 5.

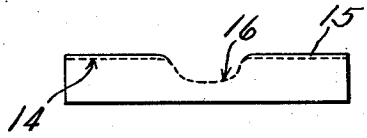


Fig. 6.

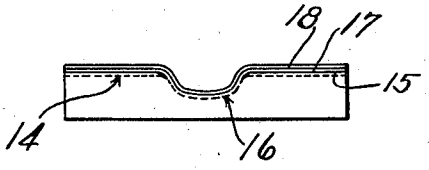


Fig. 7.

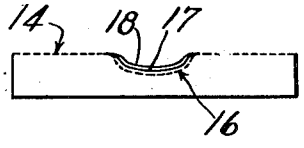
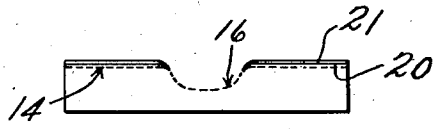


Fig. 8.



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Patented Apr. 3, 1945

2,373,060

UNITED STATES PATENT OFFICE

2,373,060

DIE STAMPING

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Application June 29, 1942, Serial No. 449,015

1 Claim. (Cl. 101—149.2)

This invention relates to an improved method of die stamping from flat steel, copper, and similar plates, also commonly called engraving.

Prior to my invention the manufacture of die stamped or steel engraved papers, boards, cloth or any other suitable material, the engraved die is inked up, then wiped with paper or with a so-called doctor blade or knife to remove the ink from the unengraved surface of the die. Only the engraved parts of the die are left inked and an impression is taken which prints and stamps at the same time, hence the term die stamping. The result is the embossed effect commonly associated with engravings and familiarly noticeable in fine stationery products.

One object of my invention is to decrease the cost of die stamping, including eliminating the necessity of using die wipe paper and the cost of the ink which is ordinarily wiped off the die by the paper, and so wasted. A further object is to prolong the life of a steel die without hardening or chromium facing. Another object is to make possible a wider use of die stamping in the stationery and similar fields. Other and further objects, such as facilitating the use of photographic methods in the preparation of the dies, and simplification of press operations in the die stamping field will be made apparent in the following specification and claims.

In the accompanying drawing, which illustrates my invention as applied to and embodied in an engraved die,

Fig. 1 is a diagrammatic sectional view of a stamping die of conventional form;

Figs. 2 to 7 inclusive show successive steps in the treatment of the die of Fig. 1 in accordance with my invention, Fig. 7 showing the resulting die ready for use; and

Fig. 8 shows a die prepared in a modified manner for use with water soluble inks.

Referring to Fig. 1, the plate or body of the die is indicated at 10. This plate may be of steel, copper or other metal commonly used in die stamping. The die has been engraved by hand or by an etching process or a combination of the two, to produce the intaglio design 11 of usual depth below the surface of the die to secure the engraved-embossed effect associated with die stamping.

I then coat the die with asphaltum or any acid-resistant material which is not soluble in water. The die is then wiped with paper to leave the asphaltum in the engraved parts of the plate only, as shown at 12 in Fig. 2. The die is then etched with an acid, suitable for the metal, sufficiently to impart a grained effect to the unengraved surface of the die as shown at 14 in Fig. 3. If the die was originally tool engraved, it is desirable to grain the surface of the engraved portion, and to this end the die may be coated as at 15 in Fig. 4 with an albumin-ammonium bichromatic solution, dried, and then for about two to five minutes exposed to a sun lamp. The die is then washed with turpentine which penetrates, without dissolving, the coating 15 and dissolves and washes away the asphaltum 12 carrying with it the overlying portion of the coating, leaving the engraved portion uncovered. The engraved portion is then provided with a grained surface, as indicated at 16 in Fig. 5, with a suitable acid. The die, as shown in Fig. 6, is next coated with an acetone lacquer such as "offset lacquer," as at 17, Fig. 6, and a coating 18 of offset developing ink is applied over the lacquer. The die is then washed with water (which may be slightly alkaline) to wash away the albumin which carries with it the overlying portions of coatings 17 and 18, leaving the latter coatings in the engraving as indicated in Fig. 7.

If the original engraving of the die was done by an etching process as contrasted with tool engraving, the engraved portion has a grained surface from its inception and the steps of Figs. 4 to 7 are modified accordingly as follows. Instead of the albumin coating 15 a coating of gum arabic is applied, and the asphaltum washed away to expose the engraving. The die is then coated with lacquer and the greasy offset developing ink as in Fig. 6 and the gum arabic coating washed away, leaving the die in the condition of Fig. 7 as before described, that is, with the engraving coated with lacquer and the greasy offset developing ink and the grained surface of the die clean.

The die is now ready, but to protect it until actual use it may be entirely coated with a water solution of gum arabic, and dried.

When the die is to be used, the protecting coating of gum arabic is washed away, the coating in the engraving, which is water-repellant, remaining in place. In the stamping operation the die is first rolled up with water to render the grained surface 14 of the die ink-repellant and the die is then rolled up with a greasy ink which fills the engraving but does not adhere to the wet grained surface of the die. The impression is then made using any ordinary hand or power operated die stamping press to which suitable water applying devices and suitable ink-

ing devices have been added, but omitting the use of die wipe paper or doctor blades.

By my invention photo-engraving or etching processes may be used in preparing the die, the etching being carried to sufficient depth to give the embossed effect desired in the finished die impression.

In die stamping it is frequently desirable to use water-color inks, in which case the grained surface 14 of the die rather than the engraving is coated with the lacquer and greasy offset developing ink, as at 20 and 21 respectively in Fig. 8, the grained surface 16 of the engraved portion being left clean for the reception of the watercolor ink which is repelled by the greasy coatings 20 and 21.

It will be understood that in the drawing the depth and width of the engraving and the thickness of the several coatings have been exaggerated for clearness, nor are the dimensions shown in relative proportion.

I claim:

The method of preparing an engraved stamping die which comprises, filling the engraved portion of the die with a non-water soluble resist, etching the unengraved portion of the die sufficiently to impart a grained surface thereto, applying to the so grained surface a coating of water soluble resist, washing away the resist in the engraved portions, etching the surfaces of the engraved portion sufficiently to impart a grained surface thereto, coating the die with offset lacquer and offset developing ink, and washing the die with water to dissolve the resist from the unengraved portion and simultaneously remove the overlying portion of the lacquer and ink coatings, leaving the engraved portion coated with offset lacquer and developing ink.

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