Feb. 29, 1944. J. G. KINLEIN 2,343,191

EMBOSSING

Filed May 1, 1943

Fig. 1.

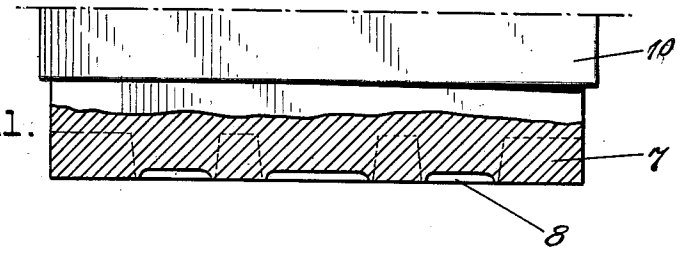


Fig. 2.

Fig. 3.

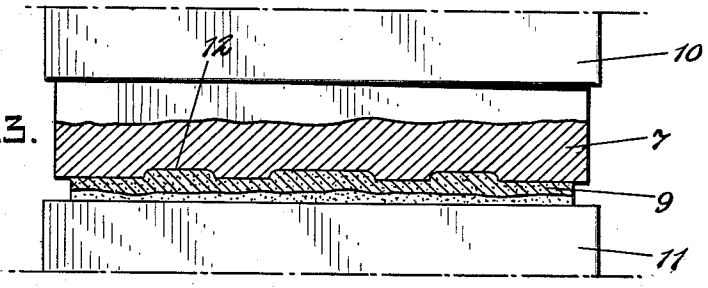
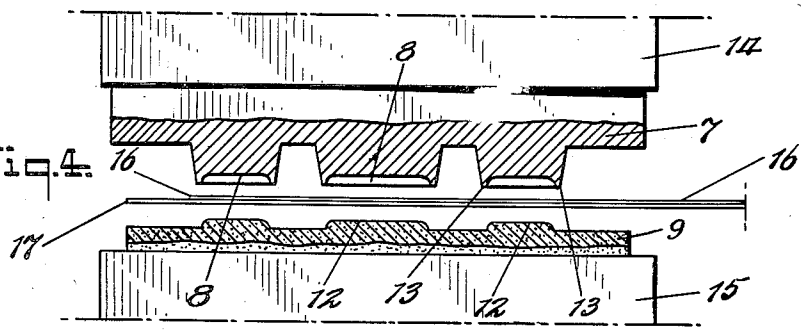


Fig. 4.



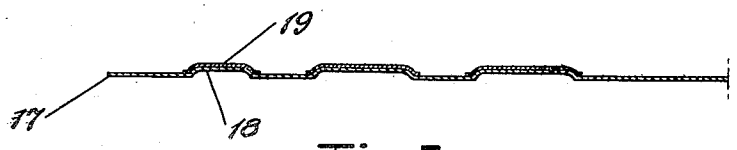


Fig. 5.

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EMBOSSING

John George Kinlein, Baltimore, Md.

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4 Claims. (Cl. 101—401.1)

The invention here disclosed relates to embossing by hot stamping methods.

As at present practiced, the die in which the design is sunk is routed about the edges of the design, then an impression is made with this routed die in "Bakelite" or similar material and then the edges of the impression sunk in the Bakelite are routed and chipped away to bring the depressed impression face up into relief.

This routing and chipping away of all the material about the design in the Bakelite is a laborious and time-taking job, requiring particular care and skill. Many times the fine edges will break away, requiring a number of efforts before a usable counter is produced. Even with the greatest of care, the edges may fray and chip, producing irregular lines in the final embossing. Also the finer lines in a design may be entirely lost and some designs may be so small that it is impossible to produce a counter under such present methods.

Also in thus relieving a counter, the best, that is the hardened mold-finished surfaces are removed, leaving the less-dense under portions for the working surfaces.

Objects of this invention are to eliminate difficulties and objections, such as mentioned incidental to present methods and to provide a practical and desirable method in which all features of a design will be retained in the counter in exact facsimile and with original mold finished raised contours.

Other special objects are to simplify and reduce the number of necessary steps, to so arrange operations that they all may conveniently be performed by one and the same operator, for instance, the die maker, instead of requiring division of operations between two or more operators as heretofore.

Other desirable objects will appear in the course of the following specification.

The drawing accompanying and forming part of the specification illustrates in somewhat diagrammatic form various steps involved in the practice of the invention. Structure and operations may vary to some extent as will later appear, all within the true intent and broad scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawing is a part sectional side elevation of a die block having certain characters or portions of a design sunk therein.

Fig. 2 is a sectional view of a blank for a counter to be pressed into the die.

Fig. 3 is a part sectional side elevation illustrating the counter pressed into the die.

Fig. 4 is a part sectional side view showing the die after routing and as mounted in the head of a press and the counter as mounted in cooperating relation on the bed of the press and with the roll leaf and paper to be embossed, in position between the die and counter.

Fig. 5 is a cross-sectional view of the embossed product.

In Fig. 1, a die block is represented at 7, having letters or other characters forming the design to be embossed sunk therein at 8.

Fig. 2 shows a blank 9, of counter-forming material, such as Bakelite in an uncured state.

Fig. 3 shows the die with the design sunk therein being used as a matrix to produce a reverse, raised facsimile of the design in hard mold-finished surfaces by pressing directly with said die on the uncured plastic blank.

Details of the press are not shown, other than the two opposed heads 10, 11, carrying the die and counter blank respectively, it being understood that these are of a type providing the necessary heat and pressure for shaping and forming the Bakelite to the permanent hard surfaced final form.

By pressing the blank directly from the die before routing, a counter is produced having raised contours 12, in exact facsimile of the design 8, sunk in the die face and all even to the finest and smallest detail. These raised outlines are all in hard smooth and glossy or glazed mold-finished surfaces, adapted in cooperation with the die to form the best, sharply defined embossments in the final product.

After having served its purpose as a matrix for forming the counter in a single, simple pressing operation, the die is routed as indicated at 13, in Fig. 4, to relieve it about the edges of the design for the necessary working clearance between the die and counter.

In Fig. 4, the die 7, and counter 9, may be considered as ready for the hot stamping operation, mounted respectively in the heated head 14, and vertically movable bed 15, of the stamping press.

This view, Fig. 4, indicates the roll leaf 16, and the paper or other medium 17, to be embossed, in position between the die and counter.

Fig. 5 is an exaggerated illustration of the finished product showing the sheet material 17, embossed at 18, by the hard sharply defined raised contours of the counter and with such embossments having the pigment, metallic powder or

other printing medium as accurately and sharply applied thereto at 19.

The production of the counter in raised form directly from the die and before the die has been routed, enables production of much finer work than has heretofore been possible under hot embossing methods. This new method is much less expensive than older methods because of the elimination of all the hand work heretofore necessary for routing the Bakelite to thereby produce a counter in raised form. Because of the sharp clean lines possessed by the new die-raised counter, the work produced is superior to that of the older methods and the new method enables production of very fine work which would be entirely lost or impossible of attainment under the old methods. The die-raised counter further enables deeper or higher embossing, for, because of the greater surface density and uncut, unbroken surface continuity, the counter is strong enough to be raised higher than would be possible under the old hand cut methods. For embossing thick materials, such as leather and the like, the die may be sunk as deep as necessary to effect the molding of the counter to a desired degree of elevation. In such a case, it may be found desirable to relieve the face of the die to some extent. Except for the fact that the die is not routed until after the counter impression is made therefrom, the die may be produced by conventional method.

The pressing of the counter may follow immediately the sinking of the die and this makes it practical for the die maker without loss of time, to press the counter and then after routing, milling, cutting or otherwise removing surplus metal about the design sunk in the die, to furnish die and counter, both in finished form, to the bookbinder, ready for the hot embossing operation.

What is claimed is:

1. The method of manufacturing a hot stamping die and counter, comprising sinking the characters to be embossed in a die, pressing with that die a raised facsimile in thermoplastic counter material and thereafter relieving the face of the die about the characters to provide operating clearance between the die and counter so provided.

2. The method of manufacturing hot stamping dies and counters, which comprises sinking the characters to be embossed in a die, raising the counterpart of said characters in finished die molded surfaces by pressing a counter with said die and thereafter relieving the face of the die about the characters to provide working clearance between the die and counter so produced.

3. The herein disclosed method of providing a die and a counter for hot stamping embossing operations, which comprises sinking the design to be embossed in the face of a die block, then using the die so produced as a matrix to form a mold-finished raised facsimile of the design by pressing with said die block on a counter blank of thermoplastic material and thereafter routing the face of the die block about the edges of the design to provide working clearance between the die and the counter so produced.

4. The method of providing a die and counter for hot embossing operations, which comprises sinking the outline to be embossed in the face of a die block, then molding a counter directly from said die block by pressing the material which is to form the counter against the face of said die block and into the outlined cavity or cavities sunk in the face of said block and thereafter relieving the face of said die block about the cavity or cavities outlined therein.

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