F. R. KUHLMANN.

EMBOSSING DIE.

APPLICATION FILED MAR. 24, 1908.

901,109. Patented Oct. 13, 1908.

Fig. 1.

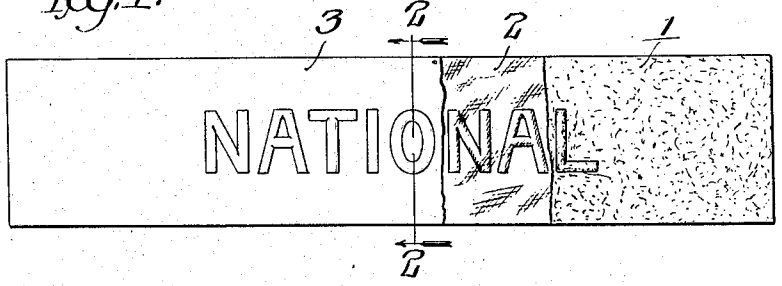




Fig. 2.

Fig. 3

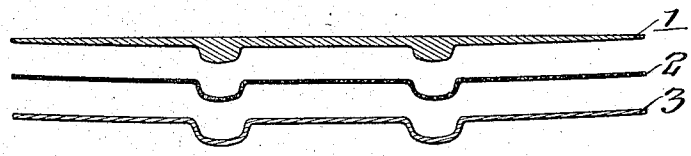


Fig. 4.

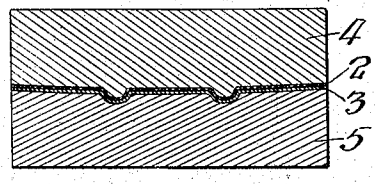


Fig. 5.

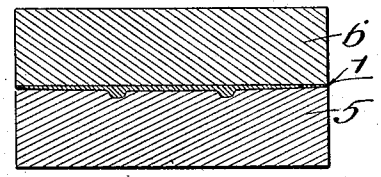
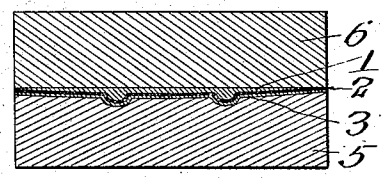


Fig. 6.



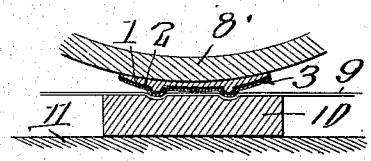


Fig. 7.

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UNITED STATES PATENT OFFICE.

FREDERICK R. KUHLMANN, OF MARSEILLES, ILLINOIS, ASSIGNOR TO HOWE & DAVIDSON COMPANY, OF EAST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

EMBOSSING-DIE.

No. 901,109. Specification of Letters Patent. Patented Oct. 13, 1908.

Application filed March 24, 1908. Serial No. 423,027.

To all whom it may concern:

Be it known that I, FREDERICK R. KUHLMANN, a citizen of the United States, and a resident of Marseilles, in the county of La-salle and State of Illinois, have invented certain new and useful Improvements in Embossing-Dies; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to embossing dies used for embossing paper or other thin sheet material, and more particularly to thin flexible embossing dies such as are applied to the impression cylinders of printing presses used in the cutting, scoring, printing and embossing of folding box blanks.

The invention also includes the process of manufacturing an embossing die of the kind referred to.

Embossing dies of the kind referred to are made thin and flexible so that they may be attached by adhesive material to the impression cylinder of a printing press, and are adapted to operate in connection with a companion die formed by a block or plate attached to the reciprocating bed of the press; the dies being made very thin in order that they will project to a slight extent only from the face of the impression cylinder so as not to interfere with the usual function of such cylinder in pressing the paper or sheet material against printing types, scoring dies or cutting dies carried by the bed of the press. Heretofore such thin dies have been made of fiber composition or papier mâché and given form when in a soft or plastic condition by pressing the same against a companion die or matrix. Dies so made, although the working faces thereof are given a considerable degree of hardness by reason of the character of the composition used, have little durability and soon wear out in service.

The object of the present invention is to provide such die with a working face of metal, without materially increasing the thickness of the body of the die, and thus retaining its flexible character, enabling it to readily conform to, and to be secured by adhesive material upon the surface of an impression cylinder.

The invention consists in the matters hereinafter described and pointed out in the appended claims.

The invention may be better understood by reference to the accompanying drawings, in which,—

Figure 1 is a face view of a die with parts broken away. Fig. 2 is a transverse vertical section on a greatly enlarged scale taken on line 2—2. Fig. 3 is a cross sectional view illustrating separately the layers of material constituting a die. Fig. 4 illustrates the method in which the face of the die is formed by means of male and female dies. Fig. 5 shows method in which the embossing design is formed on the body of the die by means of a female die and a flat faced pressure plate. Fig. 6 illustrates the manner in which the body and face of the die are combined by means of a female die and an impression plate. Fig. 7 is a sectional view showing a finished embossing die fastened to an impression cylinder of a high speed press.

In said drawings, 1 illustrates a rectangular layer of fibrous material, such as paper or strawboard, constituting a fibrous backing member corresponding in structure with the thin and flexible dies as heretofore made.

3 illustrates a rectangular layer of very thin metal such as sheet iron or the so-called "taggers" iron. Between the fibrous backing member 1 and the metal layer 3 is interposed a layer 2 of cheese cloth or some like woven fabric. The three layers are secured together by adhesive substance, the layer of cloth or woven material being employed in order to secure a strong and permanent connection between the fibrous backing and metal facing layer. The cloth is secured to the metal facing by means of flour paste, the same being used in preference to glue or the like because it is found to adhere firmly to a smooth metal surface, such as the back of the metal facing layer, and is not liable as is glue to break or give way when the parts joined by same are subjected to sharp blows or flexure. The backing member may be secured to the surface formed by the cloth

layer, by glue or the like, no difficulty being experienced in securing a strong and permanent union between the cloth and fibrous composition by the use of fish glue or any other suitable adhesive material. A die made as described will be flexible enough to readily conform to the curved surface of the impression cylinder and so thin that it will project but slightly from the surface of said cylinder when attached thereto.

As a further improvement in embossing dies of this character, the body of the die is made with very thin edges and tapering toward said edges at its marginal parts. This construction in the die prevents contact of said margins with the paper being embossed, and to thereby avoid the marring of the paper outside of the embossed part thereof.

Fig. 7 illustrates a die embodying my invention, as used in connection with a press of the kind having a rotating cylinder which presses the paper or sheet material against cutting dies, printing types or the like, carried by the reciprocating bed of the press. In said figure 8 represents the impression cylinder of such a press to the surface of which the die is attached by means of an adhesive substance.

9 designates the paper or sheet material to be embossed, and 10 illustrates a female die or matrix conforming to the face of the die on the impression cylinder. Said matrix or female die is secured to the bed 11 of the press and has backward and forward movement therewith at proper intervals during the operation of the press.

My novel process of manufacturing embossing dies of the kind described, embraces steps as follows: A layer of cloth is fastened to a layer of "taggers" iron by means of flour paste. The connected layers of metal and cloth are then subjected to pressure between dies, such as the male die 4 and female die 5 (Fig. 4), said female die 5 corresponding in form with the female embossing die or matrix used in connection with the completed die in the use of the latter on the press. A piece of thick paper or strawboard is next moistened and treated on one side with a surface hardening compound which will usually consist of plaster of paris, dextrine and fish glue. The piece of paper or strawboard is then placed upon the female die 5 with its treated side in contact with the die, and is pressed against the same through the medium of a flat-faced pressure plate 6, as shown in Fig. 5.

In order to give the desired tapered form to the marginal parts of the die, the die 5 is so shaped as to make the face of the die with inclined surfaces extending from the embossed central or working portion thereof toward its edges. The metal layer is next placed on the female die with its projecting parts entering the depressions of the said die, and a thin coating of adhesive substance, such as fish glue, is applied to the cloth surface of the metal layer. The backing member is then placed with projecting members opposite and fitting into the indentations or depressions in the rear face of layer 2 and the two layers are pressed together by the use of the flat-faced pressure plate 6. A sufficient pressure is employed in this operation to bring the facing and backing layers in close contact with each other and secure their firm adhesion. The process therefore results in the formation of an integral structure embracing a fibrous backing having a flat-surfaced back and a hard embossing surface possessing a high degree of durability and capacity to resist the pressure to which the projections on its working surface are subjected in service.

I claim as my invention:—

1. An embossing die comprising a facing layer of thin sheet metal, a layer of cloth secured to the rear face of said facing layer by adhesive material, said layers being embossed to give form to the face of the die, and a backing layer which conforms on its front face to the rear surface of the connected metal and cloth layers and which is secured to the same by an adhesive substance.

2. An embossing die comprising a facing layer of thin sheet metal, a layer of cloth secured to the rear face of said facing layer by adhesive material, said layers being embossed to give form to the face of the die, and a backing layer of fibrous material.

3. An embossing die comprising a facing layer of thin sheet metal, a layer of cloth secured to the rear face of said facing layer by adhesive material, said layers being embossed to give form to the face of the die, and a backing layer the front face of which conforms to the rear surface of the connected metal and cloth layers, and which is secured to the same by an adhesive substance, said backing layer being tapered to thin edges at its margins.

4. The process of making a thin, flexible embossing die which consists in embossing a layer of thin sheet metal, forming a layer of fibrous material by pressure in a die to conform on its front face to the rear surface of the embossed sheet metal layer, and securing said layers together by adhesive material.

5. The process of making a thin, flexible embossing die which consists in securing to the rear surface of a piece of thin sheet metal a layer of cloth, embossing the connected layers of sheet metal and cloth to give form to the face of the die, forming a layer of fibrous material by pressure in a die to con-

form on its front face to the rear surface of the connected metal and cloth layers, and securing said layer of fibrous material to the connected metal and cloth layers by an adhesive substance.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 19th day of March A. D. 1908.

FREDERICK R. KUHLMANN.

Witnesses:
W. B. DAVIDSON,
H. P. SHOTTS.