(No Model.)

W. DUNCAN.

EMBOSSING DIE.

No. 380,099. Patented Mar. 27, 1888.

Fig. 1.

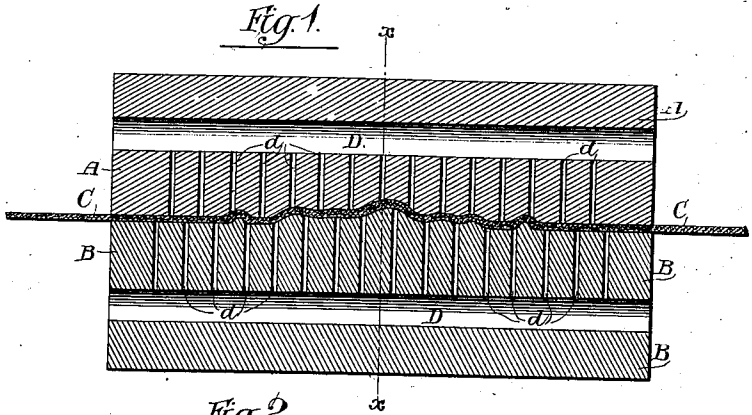


Fig. 2.

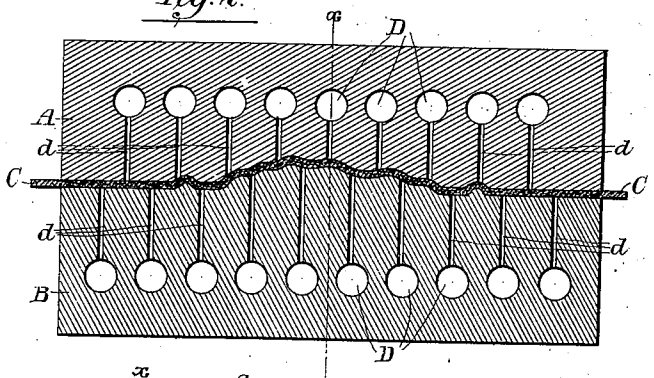


Fig. 3.

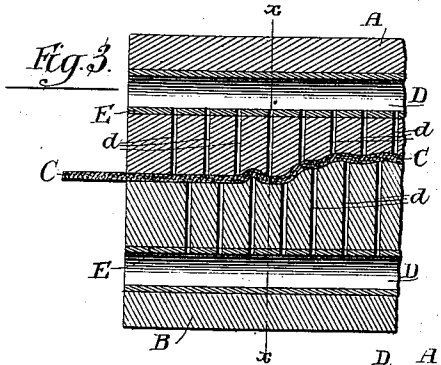


Fig. 4.

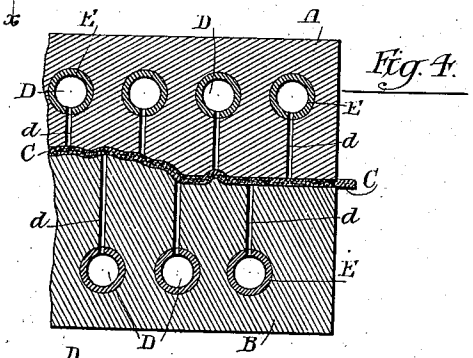
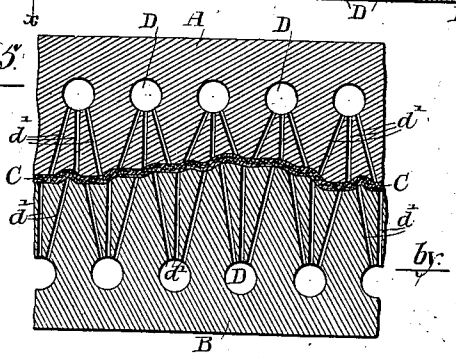


Fig. 5.



Witnesses:-
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UNITED STATES PATENT OFFICE.

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EMBOSSING-DIE.

SPECIFICATION forming part of Letters Patent No. 380,099, dated March 27, 1888

Application filed April 5, 1887. Serial No. 233,711. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM DUNCAN, of Hinsdale, in the county of Du Page 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.

This invention relates to improvements in embossing plates or dies used for forming raised figures upon paper, straw-board, and similar material.

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

In the use of embossing plates or dies of the character mentioned the latter are heated and the paper or straw-board, in a wet and soft or pulpy condition, is placed between said plates, and the inclosed layer of paper is then subjected to pressure by means of a hydraulic press or otherwise. The paper in this operation is dried by the heat of the plates while subjected to the pressure for giving shape thereto. In the operation of pressing and drying between heated die-plates in this manner a considerable quantity of steam is produced from the moisture in the paper or pulp being acted upon, and the object of this invention is to provide means for the immediate and free escape of such steam from the faces of the dies which are in contact with the paper. To this end I provide each of the die-plates with a series of transverse holes or passages opening at the outer sides or edges of the said plates, and I provide said plates, also, with a number of small passages or perforations extending from the working-faces of the said plates into the said transverse passages. By this construction means is afforded for the immediate and rapid passage of the steam generated between the die-plates outwardly to the open air.

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

Figure 1 is a sectional view through a pair of die-plates, showing the stock being operated upon as in place between them. Fig. 2 is a vertical section of the same die-plates, taken upon line *x x* of Fig. 1. Fig. 3 is a sectional view of a pair of die-plates made somewhat differently from those shown in Figs. 1 and 2, the section being taken through the main transverse passages of the die-plates. Fig. 4 is a detail section of the die-plates shown in Fig. 3, taken upon line *x x* of the latter figure. Fig. 5 is a sectional view taken transversely through the main transverse passages of the die-plates, showing a modified arrangement of the holes and passages therein.

As shown in the several figures of the drawings, A is the upper die-plate, B the lower die-plate, and C a layer or thickness of paper, straw-board, paper-pulp, papier-maché, or other similar material placed between the said die-plates.

As shown in Figs. 1 and 2, the die-plates A and B are provided with a series of transverse passages, D D, arranged to extend through the plates from edge to edge thereof, and generally parallel with the working-faces of the plates. In the particular construction shown said passages D D are arranged to extend entirely through the plates from edge to edge thereof. *d d* in said Figs. 1 and 2 indicate a series of small holes or passages extending from the working-faces of the dies into the passages D D.

In the operation of dies thus made steam generated from the moist layer, C, which is undergoing pressure will pass through the holes *d d* into the passages D D, and thus escape outwardly to the open air. In the construction of embossing-plates provided with passages D D and holes *d d* said passages and holes may be made in any desired or convenient manner—as, for instance, by boring through the finished plates or by the use of suitable cores in casting the plates.

The plates illustrated in Figs. 3 and 4 contain the same features of construction present in the plates before described. In these figures, however, I have shown a construction whereby the formation of the main passages D D may be greatly facilitated. E E in said Figs. 3 and 4 indicate metal tubes which extend through the body of the plates A and B, and within which are formed the said passages

D D. These tubes E E are made of some metal having a higher melting or fusing point than that of which the plates themselves are composed—as, for instance, if the plates are made of type-metal or a similar composition, the tubes E E may be made of iron or brass. In constructing the plates, when provided with tubes E E, in the manner shown, the tubes are suitably held within the mold and the metal of the die cast around them, so that the passages D D are formed without the use of cores in casting and without the necessity of afterward boring the plates. When the passages D are formed by means of tubes E E, in the manner described, the holes *d d* may be formed by boring through from the working-faces of the dies and the tubes into the said passages D D. However, the said passages may be cast in the plates by means of small cores secured in perforations in the tubes, in a familiar manner.

I have shown in the figures of the drawings above described a single line or series of holes *d d* as communicating with each transverse passage D D. This construction is not, however, essential, and a number of the holes *d d* may communicate with each passage D by boring or forming said holes *d d* obliquely in the metal of the plates. Such a construction is illustrated in Fig. 5, which shows each transverse passage D as communicating with several radially-arranged holes, *d' d'*.

For carrying out the main features of my invention it is not, obviously, essential that the passages D D should be arranged parallel with each other, as shown, or that they should communicate with the open air at both ends through both sides or edges of the plates, and I do not therefore limit myself to the construction shown in these particulars—as, for instance, the said passages D D may be arranged radially or in any other manner found convenient or desirable.

I am aware that it has been proposed heretofore to employ holes or passages for the escape of steam extending entirely through embossing-plates from the working-faces thereof to the opposite or rear surfaces of the same. This construction has the disadvantage that the holes are liable to become stopped or choked up by foreign matter accumulating on the rear surfaces of the plates. In the construction proposed by me a perfectly-free exit for steam is afforded at all times through the passages D, and at the same time a smooth and unperforated bearing-surface is afforded at the backs of the plates for contact with the opposing plates of the press. Inasmuch as the construction illustrated in Figs. 3 and 4 affords a cheap and convenient means of constructing plates having passages arranged as described, a construction embracing said tubes is herein claimed as part of my invention.

I claim as my invention—

1. An embossing plate or die consisting of an integral casting and provided with a working-face or matrix at one side and a flat bearing-surface for engagement with the platen or bearing-surface of the press at its opposite side, with a series of passages formed in said block or casting between the working-face or matrix and the flat bearing-face and opening at their ends through the sides or edges of the die, and with holes or perforations extending through the metal of the die from the said working-face or matrix thereof into said passages, substantially as described.

2. An embossing plate or die consisting of an integral casting provided with a working-face or matrix at one side and a flat bearing-surface at its other side, said casting having open-ended tubes E E cast therein between its matrix or working-face and its rear or bearing face, said tubes extending to the side edges of the plate or die, so as to form passages opening at the side face or edges of the plate or die, said plate or die being provided also with holes or perforations extending from the working-face or matrix through and into the said tubes E E, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

WILLIAM DUNCAN.

Witnesses:

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CHARLES T. LORING.