J. M. DOW.

METHOD AND APPARATUS FOR MAKING STEREOTYPE PLATES.

APPLICATION FILED MAY 6, 1911.

1,022,067.

Patented Apr. 2, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

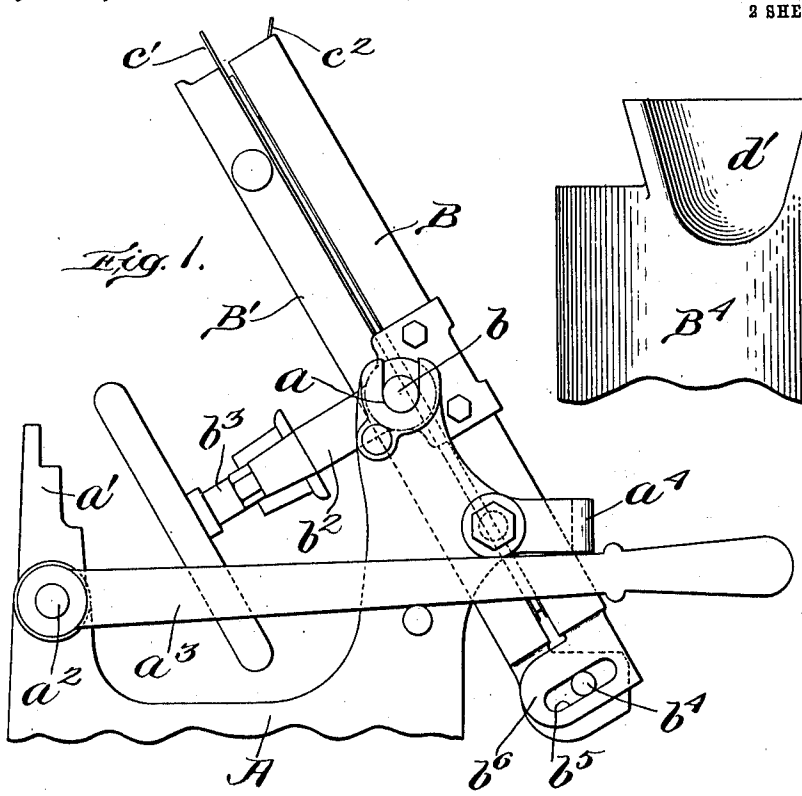


Fig. 6.

Fig. 2.

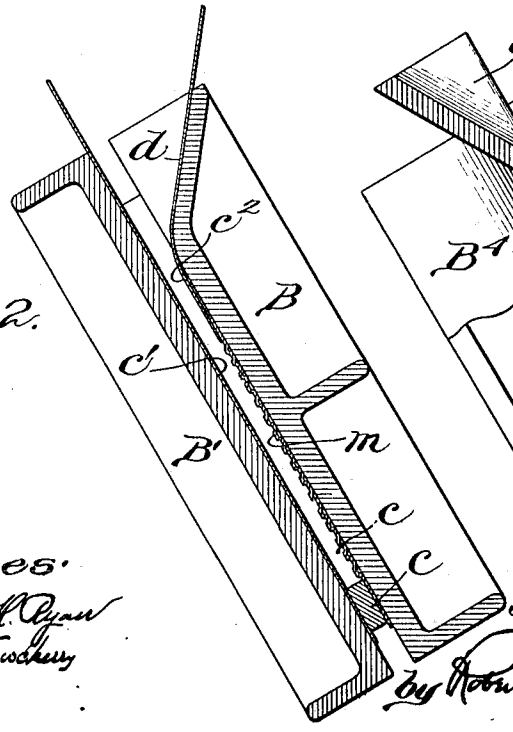
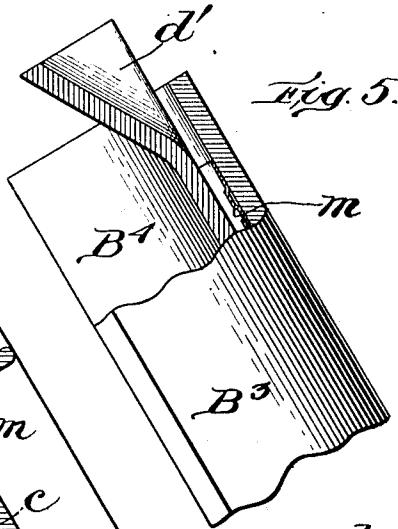


Fig. 5.



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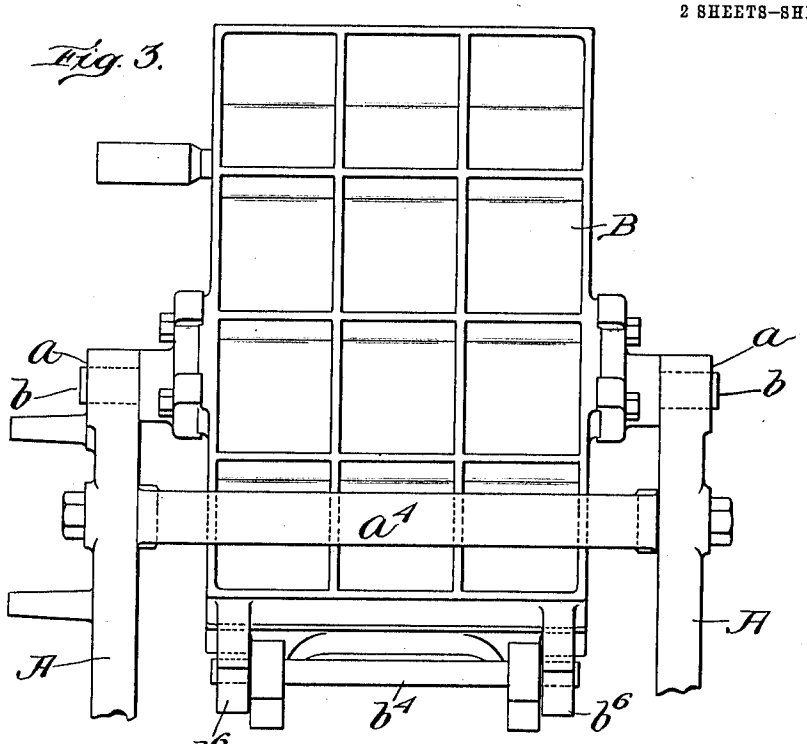
2 SHEETS—SHEET 2.

Fig. 3.



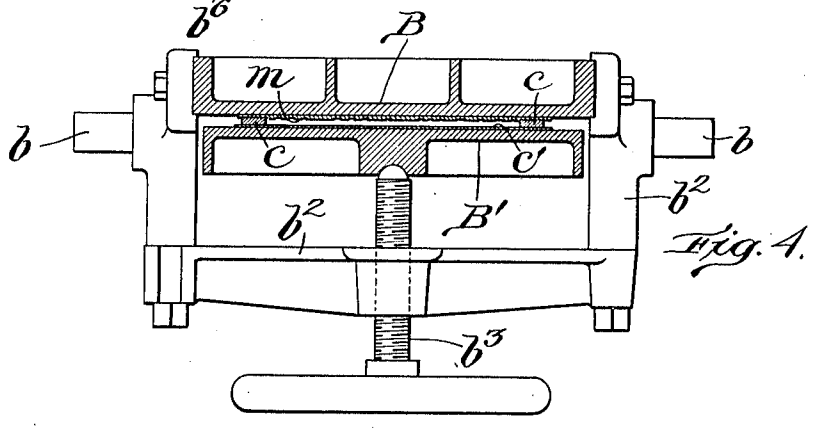
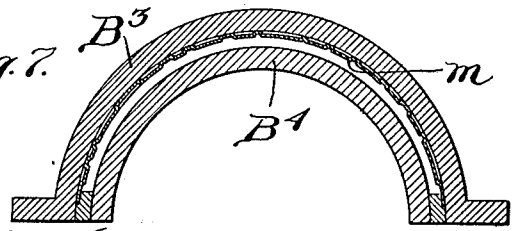


Fig. 4.

Fig. 7.



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METHOD AND APPARATUS FOR MAKING STEREOTYPE-PLATES.

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To all whom it may concern:

Be it known that I, JAMES MARSHALL DOW, a citizen of the United States, and resident of Everett, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Methods and Apparatus for Making Stereotype-Plates, of which the following is a specification.

This invention relates to the making of stereotype plates, and consists in a new method of casting such plates and a new apparatus therefor, by the use of which air holes or "blow holes," as they are usually called, in the face of the plate, will be eliminated.

The problem of casting stereotype plates without air holes in the face of the plate has long engaged the attention of the makers of stereotype plates and casting boxes therefor, but has hitherto remained without satisfactory solution; and no method or apparatus thus far employed has made it possible with certainty to produce stereotype plates without air holes in the face. The precise cause of such air holes is somewhat obscure, but I believe them to be due to the fact that under present practices when the molten metal is introduced into the casting boxes, whether by pouring it or forcing it in under hydraulic or other pressure, it has to flow either downwardly or laterally, or both, into the depressions or indentations of the matrix, which is in the lower side of the inclined casting box. When the metal is poured in from the top it has to flow over the whole surface of the matrix to the bottom of the box, and in so doing tends to cascade over the uneven surface of the matrix, entrapping small bubbles of air between the metal and the matrix surface. The same result occurs when the box is supported in vertical position. The metal hardens almost instantly and before the air bubbles have any chance to rise and work their way out, so that the surface of the finished plate is almost invariably pitted or pock marked by the air holes. Similarly, should the molten metal be forced into the casting box at the bottom by hydraulic or other pressure, the entrance of the metal would be very rapid, and as it flowed upwardly over the surface of the matrix and laterally into the depressions therein, it would entrap bubbles of air, which would leave air holes in the face of the plate, just as when the metal is poured in from the top. Thus, with the matrix in the lower side of the inclined box, or at one side of a vertically supported box, the metal flows over the surface of the matrix, whether it be introduced from the top or the bottom, and also has to flow laterally to fill the indentations of the matrix; and as the metal moves rapidly it tends to bridge and confine air spaces as it cascades from one projection of the matrix to the next, instead of wholly filling the matrix and driving out the air before it. Whether this is the true explanation of the cause of the formation of the air bubbles or not, the foregoing conditions are avoided by my method, and stereotype plates made according to my method are wholly free from air holes in the face. With my method instead of causing the metal to flow downwardly or laterally into the indentations of the matrix, or over the surface of the matrix, I introduce the metal into a casting box having an inclined and overhanging matrix surface with the result that the metal rises against the matrix surface and into the indentations without downward or lateral flowing.

For performing my new method I have also invented certain improvements in stereotype casting boxes, illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of the box for casting flat stereotype plates; Fig. 2 is a longitudinal, central section, enlarged and partly broken away, of the casting box shown in Fig. 1; Fig. 3 is an elevation of said casting box viewed from the right of Fig. 1; Fig. 4 is a cross section through the middle of said casting box; Fig. 5 is a longitudinal section of the upper end of a casting box for making a curved stereotype plate; Fig. 6 is an elevation of the upper end of the lower or smooth section of the casting box shown in Fig. 5; and Fig. 7 is a cross section of said curved casting box.

Referring first to Figs. 1 to 4 of the drawings, A represents the supporting frame provided with trunnion bearings *a*.

a' represents a notched support for one end of the casting box, while the box and matrix are being assembled, said support *a'* being pivoted to the frame at a^2, and operated in the usual way by the handle a^3; and a^4 represents a bow-shaped bar secured

transversely of the frame A below the bearings *a*.

The casting box consists of the box-section B and the separable cover section B′. Trunnions *b*, secured to the sides of the box-section B, are supported in the bearings *a*. In the construction herein shown said trunnions project from the yoke-shaped frame b^2 which is bolted at its ends to the sides of the box section, and extends across the casting box to support the clamping screw b^3 by which the cover section B′ is clamped to the box section B. The ends of the bar b^4, secured to the cover section B′, engage slots b^5 in ears b^6 on the box-section B, and form a pin and slot connection between the two sections of the casting box.

The casting box is shown in the drawings in operative position for performing my new method. When the box and the matrix are being assembled, the box is swung on its pivot bearing to substantially horizontal position with the box-section B lowermost. The end of the box will then rest on one of the notches of support *a*′. The matrix *m* is then placed face upward in the box-section B, the bearers *c* are placed on the margins of the matrix in the usual way and a sheet of paper *c*′ is placed on top of the bearers. Another piece of paper c^2 is preferably placed over the end of the matrix which will be uppermost in operation, to prevent any metal from running under the matrix. The cover B′ is then closed and clamped against the bearers. By lifting handle a^3 the support *a*′ will be moved from under the end of the casting box, permitting that end to swing downward, and the casting box may be swung on its pivot bearings, past the vertical position, into an inclined position as shown in the drawings with the matrix surface overhanging the opposed smooth surface of the cover section. The transverse bar a^4 engages the outer side of the box-section, and acts as a stop to arrest and hold the casting box in its proper inclined position with the matrix surface overhanging the smooth surface. The metal is then introduced into the box, as by pouring into the upper end of the box, and flows down the smooth surface of the cover section, rising against the overhanging matrix surface and rising into the indentations, without flowing down over the surface of the matrix or flowing laterally into the indentations. The rising surface of the metal drives out all air before it and wholly fills the matrix surface, resulting in a stereotype plate, when hardened, free from air holes in its surface.

The casting box shown in Figs. 5 to 7 differs from that already described only in that the box-section B^3 is curved or cylindrical in form, the matrix *m* being placed on the concave side, and the cover section B^4 is similarly curved, its convex side forming the smooth surface of the stereotype plate.

The mounting, manipulation, and operation of the two forms of casting boxes are substantially the same, one forming a flat plate and the other a curved plate. One section of each box is beveled or flared outwardly to form a trough-like or funnel-like entrance for the metal. In the flat box the box-section is beveled as shown at *d* and in the curved box it is the cover section which is made with the trough *d*′.

The precise angle at which the overhanging matrix surface stands when in operative position is not material. It is essential that it be swung past the vertical position, that is, to an inclined position at an angle exceeding ninety degrees with a horizontal plane, but less than one hundred and eighty degrees with such plane. In practice I have obtained good results by bringing the overhanging matrix surface to an angle of substantially one hundred thirty-five degrees with its original horizontal position, but it will be understood that some variation from that angular position may be allowed without departing from my invention.

I claim:—

1. The method of casting a stereotype plate consisting in introducing molten metal into a casting box having a matrix surface which is inclined and overhanging throughout its whole extent, whereby the metal will rise against the matrix surface and into the indentations thereof without flowing over any part of the matrix surface.

2. A stereotype casting box, comprising two opposed walls spaced apart, said box being supported in an inclined position, and a matrix secured against the upper of said opposed walls, the inclined matrix surface throughout its whole extent overhanging the lower wall surface, whereby the molten metal will flow over the lower surface of the box and rise against the matrix surface without flowing over any part of the matrix surface.

3. A stereotype casting apparatus, comprising a supporting frame, a casting box having a box-section and a separable cover section, the box-section being pivotally mounted on said frame and adapted to contain a matrix, said box being revoluble to an inclined position at an angle exceeding ninety degrees with a horizontal plane, whereby the box-section will overhang the cover section.

4. A stereotype casting apparatus, comprising a supporting frame, a casting box having a box-section and a separable cover section, the box-section being pivotally mounted on said frame and adapted to contain a matrix, said box being revoluble to an inclined position at an angle exceeding ninety degrees with a horizontal plane,

whereby the box-section will overhang the cover section, and a stop to arrest and hold said box in such inclined position.

5. A stereotype casting apparatus, comprising a supporting frame, a casting box having a box-section and a separable cover section, the box-section being pivotally mounted on said frame and adapted to contain a matrix, said box being revoluble to an inclined position at an angle exceeding ninety degrees with a horizontal plane, whereby the box-section will overhang the cover section, and a bar secured transversely of said frame, adapted to engage said box to arrest and hold said box in such inclined position.

Signed by me at Boston, Massachusetts, this second day of May 1911.

JAMES MARSHALL DOW.

Witnesses:

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