(No Model.) 3 Sheets—Sheet 1.

J. W. OSBORNE.

PAPIER MACHÉ MATRIX DRYING APPARATUS.

No. 440,923. Patented Nov. 18, 1890.

Fig. 1.

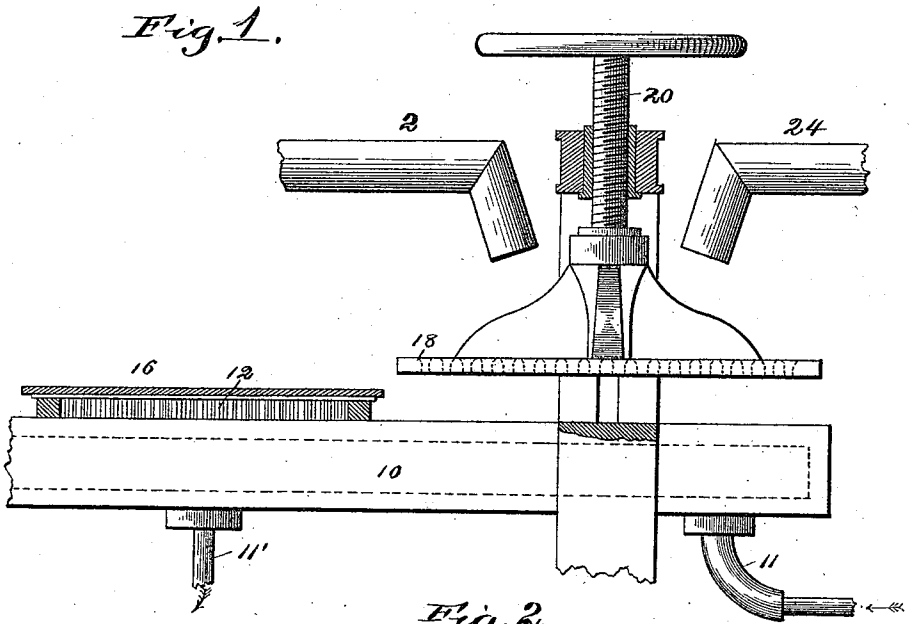
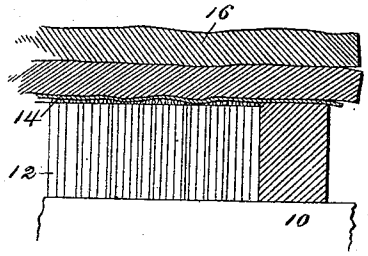


Fig. 2.

Fig. 8.



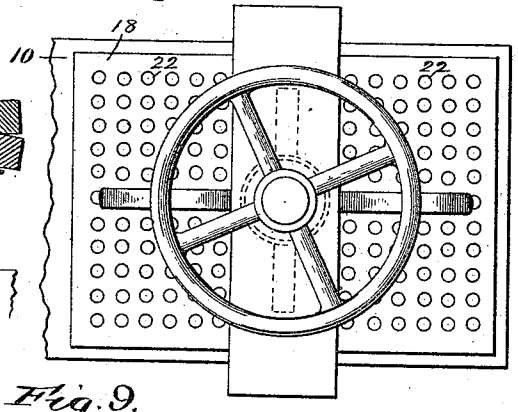
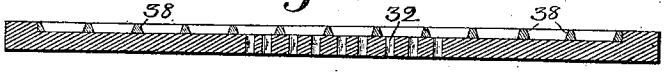


Fig. 9.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 4.

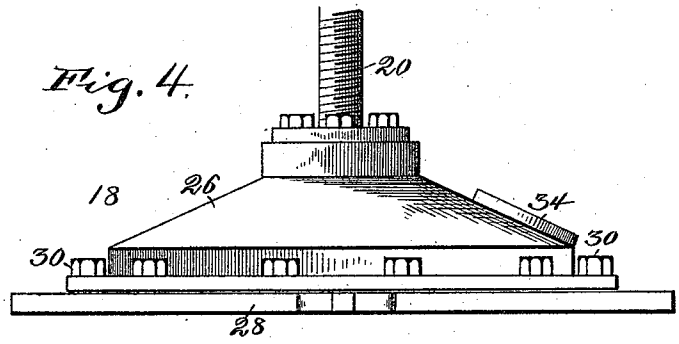


Fig. 5.

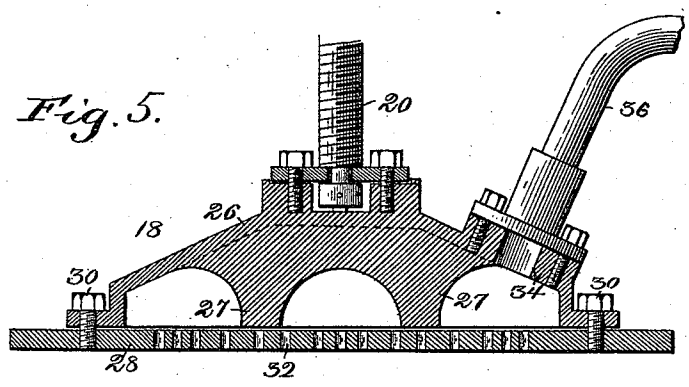
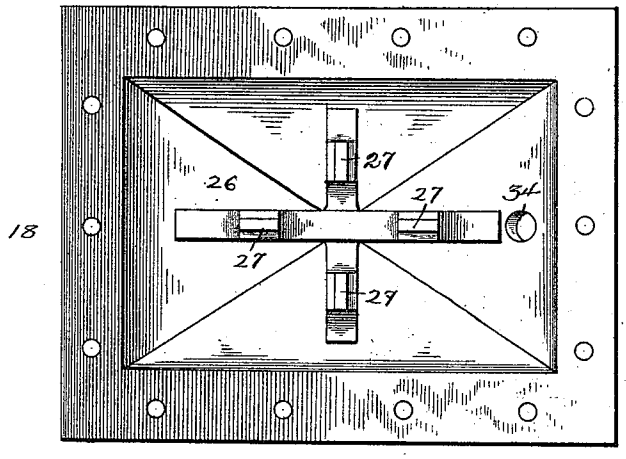


Fig. 7.



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PAPIER MACHÉ MATRIX DRYING APPARATUS.

No. 440,923. Patented Nov. 18, 1890.

Fig. 6

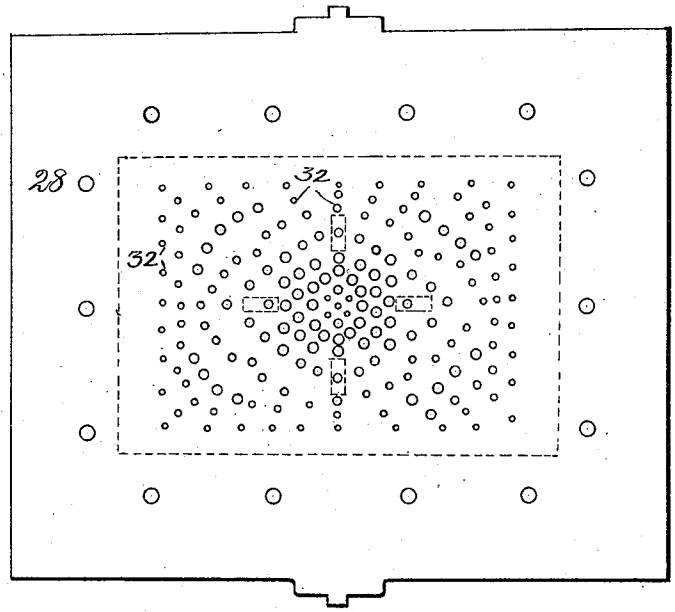
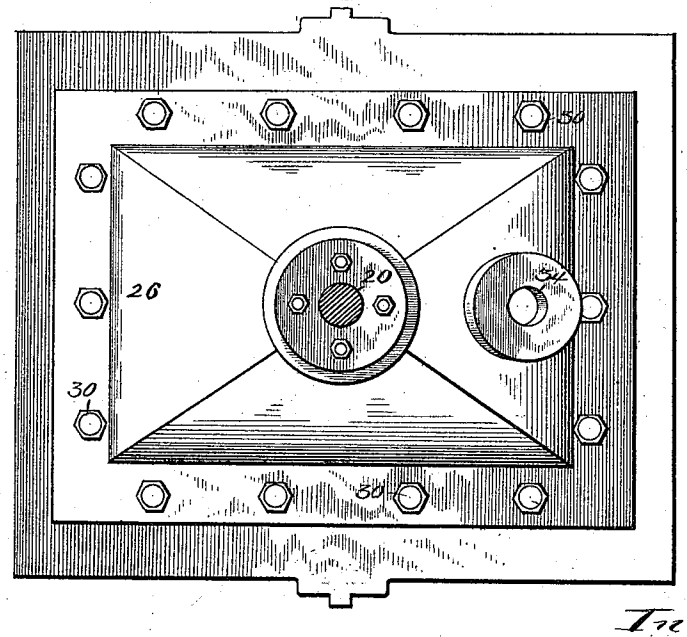


Fig. 3



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UNITED STATES PATENT OFFICE.

JOHN W. OSBORNE, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-THIRD TO CARL EDELHEIM, OF PHILADELPHIA, PENNSYLVANIA.

PAPIER-MACHÉ-MATRIX-DRYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 440,923, dated November 18, 1890.

Application filed August 22, 1890. Serial No. 362,764. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. OSBORNE, a subject of the Queen of Great Britain, and a resident of Washington, in the District of Columbia, have invented certain new and useful Improvements in a Papier-Maché-Matrix-Drying Apparatus, of which the following is a specification.

This invention has reference to improvements in apparatus for making papier-maché matrices for stereotyping, and the same is more especially adapted to the manufacture of papier-maché matrices in accordance with a process invented by me, and for which I have filed an application for Letters Patent on February 12, 1889, Serial No. 299,666.

In accordance with the invention set forth in my aforesaid application papier-maché matrices are made by beating or otherwise forcing a wet sheet of stratified paper into the interstices of the form, then pressing and holding it in intimate contact with the form by the mechanical pressure of the platen, and then drying the matrix while so held by passing a current of air over the paper. This process may be and is preferably amplified by heating the form while the same is held in contact with the paper and while the air-current is passed over the latter, and it is further amplified by heating the air used in the process or by drying the same before it is impelled against the matrix, or both. In the practice of this process I have found that it is further improved by forcing a greater volume of air against the central portion of the matrix than against the portions extending from the middle toward the edges, and the best results were obtained when the amount of air impelled against the matrix gradually decreased toward the edges.

The apparatus which constitutes my present invention embodies in its construction the fundamental idea of my improved process and shows several means for practicing the same effectively; but it will be understood that I do not mean to be limited to the identical structures herein shown and described, since the same may be variously changed and modified without departing from the principles of my invention. All this will more fully appear from the following detailed description with reference to the accompanying drawings, in which—

Figure 1 represents in side elevation and partly in section a matrix-press with accessory appliances, showing a form on the press-table ready to go under the platen, the whole constructed in accordance with my invention. Fig. 2 is a plan view of the same without the form. Fig. 3 is a plan view of a modified kind of platen provided with an inclosed chamber. Fig. 4 is a side elevation of the same. Fig. 5 is a vertical longitudinal section of the same platen. Fig. 6 represents a plan view of the face-plate of the platen, illustrating the distribution of its perforations; and Fig. 7 is an inverted plan of the platen with the face-plate removed, exhibiting the strengthening-ribs within the chamber. Fig. 8 is a vertical section, partly in elevation and upon an enlarged scale, of a portion of the form with matrix and blankets ready to receive the platen-pressure; and Fig. 9 illustrates in section a supplemental face-plate adapted for use with a form smaller than the platen.

In its simplest form my invention is represented in Figs. 1 and 2. The hollow bed-plate 10, preferably made of iron, is tapped at one point by a pipe 11, by which steam is admitted to heat the bed-plate to the desired degree, and preferably to or above 212° Fahrenheit, and at another suitable point the bed-plate is tapped by another pipe 11′, by which steam, after having circulated within the hollow bed-plate, is allowed to escape. Upon this bed-plate the pages of type 12 are placed, face up, and properly locked in a chase. (See also Fig. 8.) The type collected within the chase is known, technically, as the "form," and upon this form the pasted paper sheets 14 are beaten down by a brush or otherwise and are then covered with two or more thicknesses of blanket of open felt 16. The form, with the superimposed stratified paper and with the felt blankets, is designed to be pushed under the platen 18, which in effect is nothing but the follower of an ordinary press actuated by the screw 20 by means of a hand-wheel, as indicated, or in any other suitable manner.

In accordance with my invention the platen 18 is provided with a great number of perfo-

rations 22, so that when the platen is forced down upon the blanket a current of air impinging upon the platen will find numerous passages through said platen, through the blankets, and along the upper surface of the stratified paper, and will escape at the edges of the latter, carrying with it the moisture contained in the paper, more especially if the air forced over the surface of the paper is dry and heated. The heated bed-plate communicates its heat to the form from the under side, and the form in turn heats the matrix-paper also from the under side, so that the moisture contained in the matrix is driven as steam or vapor toward the upper surface thereof, from whence it is removed by the air-current.

In Fig. 1 I have indicated the simplest means for producing the necessary air-currents, the same consisting of air-blast pipes 24 24, communicating with a source of compressed air, (not shown,) and which it is not necessary to show, and these blast-pipes have their openings so arranged, as indicated in Fig. 1, that the air-currents coming from the same will directly impinge upon the back of the platen.

It will now be seen that my invention provides a matrix-press with means for heating the bed-plate of the same and with air-passages through the platen of the press, as also with means for causing currents of air to be directed through the air-passages of the platen and against and along the back of the papier-maché matrix.

While the arrangement shown in Figs. 1 and 2 is quite effective, I provide a specially-organized apparatus for the regular practice of my aforesaid process, which apparatus has certain important advantages over the more simple arrangement illustrated in Figs. 1 and 2. This specially-organized apparatus is illustrated in Figs. 3, 4, 5, 6, and 7. In this case the platen 18 consists of two parts bolted together. One part, which may be called the "platen-body," is shown in the drawings as a bell-shaped casting 26, having formed within the bell-chamber strengthening-ribs 27, and having the screw 20 of the press swiveled to its upper end, as is clearly shown in Fig. 5. This bell-shaped platen-body has a perforation 34, which communicates with the bell-chamber and with the air-pipe 36, by which compressed air is forced into the bell-chamber or through which the air from the bell-chamber is exhausted. The air-pipe 36, therefore, must be supposed to be extended and connected either with an air compressing or exhausting pump or with fans properly constructed and operated to either force air into the bell-chamber or to exhaust the air therefrom. For the purposes of my present invention the particular construction of the apparatus of the air pump or blower is of no consequence, and for this reason it is deemed unnecessary to illustrate such pump or blower.

The second part of the platen, which will hereinafter be referred to as the "face-plate," is a flat rectangular plate 28, of iron or other suitable material, bolted to the chambered platen 26 by screw-bolts 30, and this face-plate has a series of perforations 32, which are preferably distributed as indicated in Fig. 6—that is to say, these perforations are crowded together in the central portion of the face-plate and are more liberally spaced as they recede from the center, so that the number of air-passages gradually decreases from the center outward in all directions.

In operation my improved matrix-press is used in a manner which will now be easily understood. The hollow bed-plate is heated to the desired temperature by the circulation of steam through the same. A stratified sheet of paper properly wetted is then placed on the type end of the form and is beaten into the interstices of the latter by a brush or otherwise, as usual. One or more blankets of either open felt or flannel are then placed upon the matrix-paper, all as indicated most clearly in Fig. 8, and the form with the superimposed matrix-paper and blankets is then moved into proper position under the platen, which is then forced down upon the blankets like the follower of an ordinary press. Some of the moisture of the matrix is at once absorbed by the blankets, and, the matrix-paper becoming heated, the moisture has a tendency to escape through the perforations in the face-plate into the bell-chamber. If now compressed air is admitted into the chamber through the air-pipe 36, this air, together with the vapors from the matrix-paper, is forced through the blankets and is deflected along the surface of the matrix and escapes at the edges of both. If, on the other hand, the air exhausted from the bell-chamber, the external air will rush in through the blankets at the edges of the same and along the surface of the matrix into the bell-chamber and then out by the air-pipe 36. In either case the air-current thus produced over and along the upper surface of the matrix will carry off every particle of moisture in a very remarkably short time, the process of drying occupying altogether not more than between one and two minutes.

With a matrix-press constructed in the manner so far described the matrices to be operated upon must be large enough to cover all the perforations 32 in the face-plate, for otherwise the air-current would take by preference its path through the uncovered perforations, and in order to adapt the matrix-press to smaller sizes of matrices I use supplemental face-plates of the kind illustrated in Fig. 9. This supplemental face-plate is provided upon its back with a shallow recess of such size that when applied to the normal face-plate said recess extends over all the perforations in the normal face-plate.

A suitable number of studs 38, rising from the bottom of the recess just high enough to bring their upper ends into one plane with

the ledges left by the recess, together with these ledges, receives the pressure of the normal face-plate, and this supplemental face-plate has suitably-spaced perforations in its central part, which perforations extend over an area about equal to the area of the smaller size matrix, which it may be desired to use in the press constructed for the larger matrices of normal use.

In use the supplemental face-plate may be simply placed upon the blankets, and then, together with the form, slid under the platen, as if it were a kind of additional metallic blanket.

With my improved matrix-press all cockling or buckling of the matrix is positively prevented, notwithstanding the great rapidity with which the drying of the matrix progresses, for the matrix is at all times held by mechanical pressure in position upon the form.

Having now fully described my invention, I claim and desire to secure by Letters Patent—

1. In a papier-maché-matrix-drying apparatus, the combination of a bed-plate with a perforated follower or platen, and means substantially as described, for causing an air-current through the platen and over the matrix interposed between the platen and the bed-plate in either direction, substantially as described.

2. A papier-maché-matrix-drying press consisting of a bed-plate and a follower or platen having numerous perforations spaced with gradually-decreasing density from the center toward the edges, substantially as described.

3. In a papier-maché-matrix-drying apparatus, the combination of a bed-plate and a perforated follower or platen with an air-blast pipe or pipes directed with the opening toward the back of the platen, substantially as described.

4. In a papier-maché-matrix-drying apparatus, the combination of a bed-plate and a follower or platen consisting of a bell-shaped platen body and a perforated face-plate with an air-conduit pipe communicating with the bell-chamber of the platen, substantially as described.

5. In a papier-maché-matrix-drying apparatus, the combination of a hollow bed-plate provided with steam inlet and outlet pipes for heating the bed-plate and a perforated follower or platen with an air-blast pipe or pipes directed with the opening toward the back of the platen, substantially as described.

6. In a papier-maché-matrix-drying apparatus, the combination of a bed-plate and a follower or platen having a face-plate provided with perforations distributed over an area corresponding to the area of a matrix of normal size with a supplemental face-plate recessed on one side and having perforations extending over the area of a matrix of smaller size, and means, substantially as described, for producing air-currents through the face-plates and over the matrix in either direction, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

J. W. OSBORNE.

Witnesses:
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F. T. CHAPMAN.