Aug. 1, 1950 C. C. BAKER 2,517,273

METHOD AND MEANS FOR DRYING AND SHRINKING MATRICES

Filed June 25, 1946 3 Sheets-Sheet 1

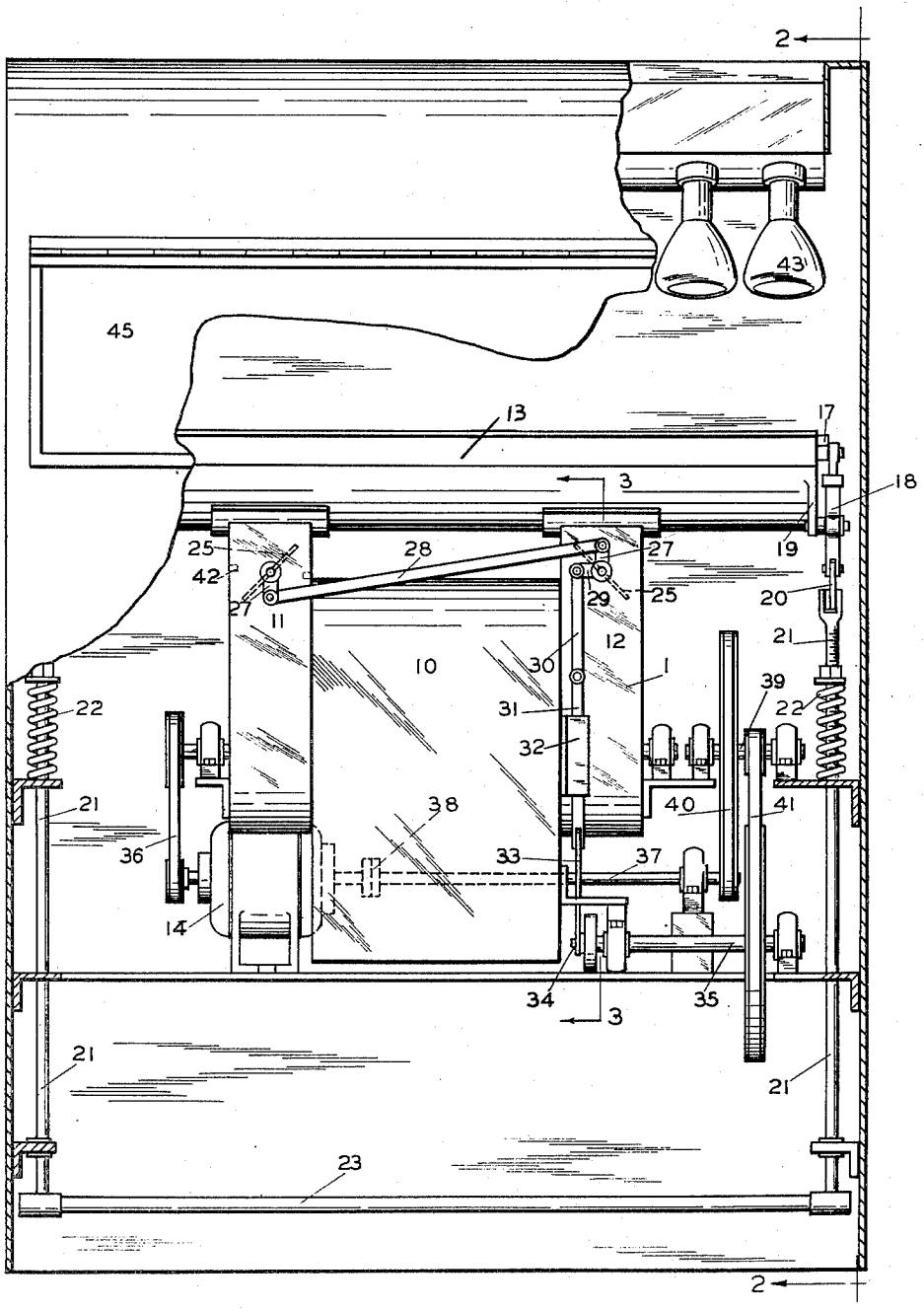


Fig 1

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Filed June 25, 1946 3 Sheets-Sheet 2

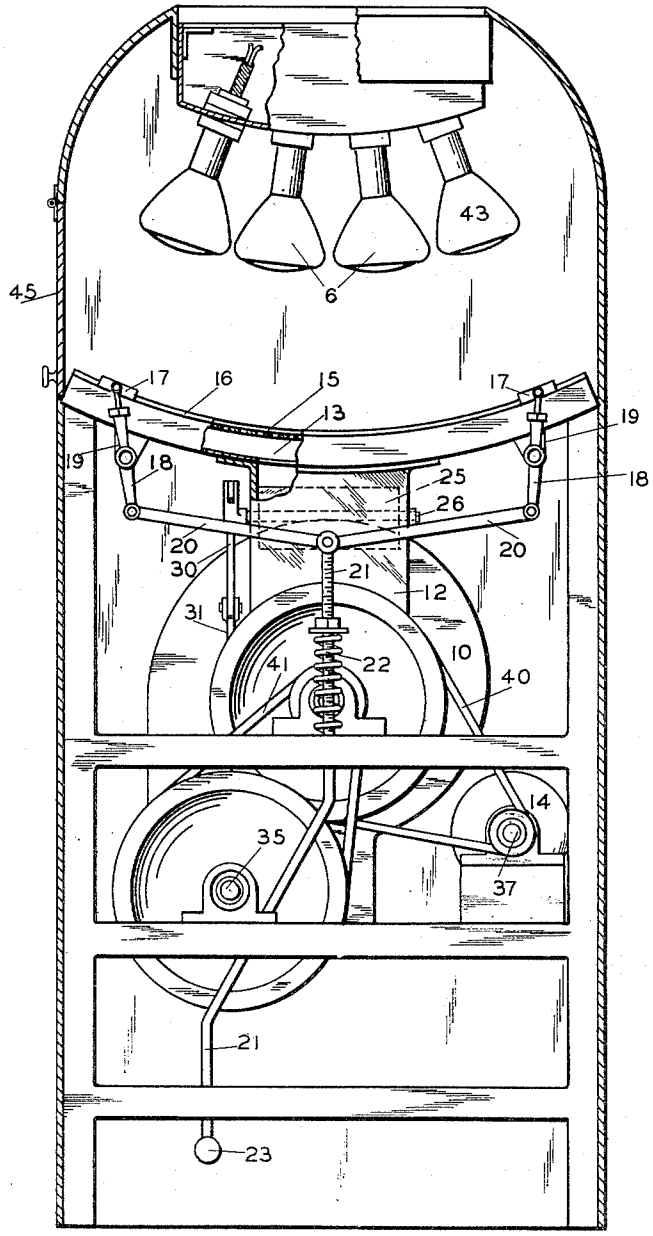


Fig 2

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METHOD AND MEANS FOR DRYING AND SHRINKING MATRICES

Filed June 25, 1946 3 Sheets-Sheet 3

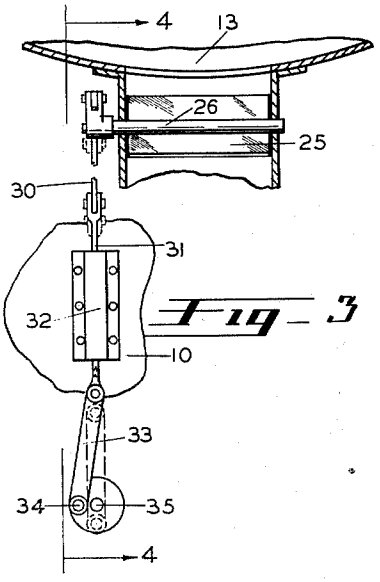


Fig. 3

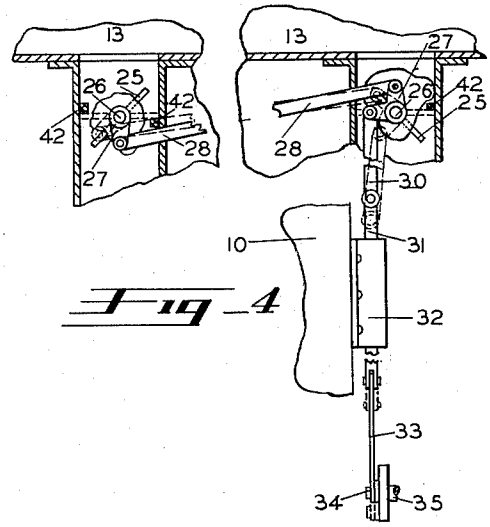


Fig. 4

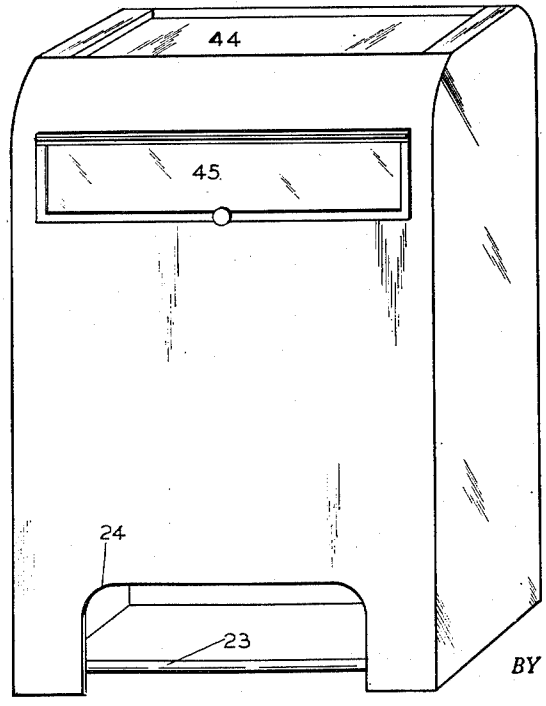


Fig. 5

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UNITED STATES PATENT OFFICE

2,517,273

METHOD AND MEANS FOR DRYING AND SHRINKING MATRICES

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Application June 25, 1946, Serial No. 679,049

4 Claims. (Cl. 34—16)

1

This invention relates to the drying and shrinking of matrices to be used in the casting of stereotype plates for cylindrical newspaper presses and the like, and is a continuation in part of my co-pending application, Serial No. 662,241, now Patent No. 2,492,348, filed April 15, 1946, and entitled Matrix Dryer and Shrinker.

It is the object of this present invention to obtain increased shrinkage of the matrix. Maximum shrinkage of the matrix is desirable, since this enables the size of the printed page to be reduced and thus results in a saving of paper.

In my experiments with the drying, forming and shrinking of matrices, I found that the lower the vacuum pressure to which the matrix is subjected, that is to say, the slighter the degree of rarefaction in the vacuum chamber against the wall of which the matrix is held, the greater will be the amount of shrinkage, all other conditions being the same. Thus the greatest amount of shrinkage would occur if the matrix were not subjected to any vacuum pressure whatever. However, some pressure is required for holding the matrix in place even during the early stages of the drying, forming and shrinking of the matrix.

Carrying my experiments further in this connection I discovered that increased shrinkage of the matrix could be obtained by subjecting the matrix to a pulsating vacuum pressure, during the drying of the matrix, instead of a constant or steady vacuum pressure. My explanation of this fact is that, in a pulsating pressure, the pressure actually exerted on the matrix is greatly decreased during a considerable portion of each cycle of the same.

The object of the present invention accordingly is to increase matrix shrinkage by the substitution of a pulsating vacuum pressure, in place of the customary constant or even vacuum pressure, for holding the matrix against the forming plate during the drying of the matrix.

A further object of this invention is to provide a simple, practical device in which the matrix will be subjected to the desired pulsating vacuum pressure during all or part of the drying stage.

Such a device is illustrated in the accompanying drawings in which:

Fig. 1 is a side elevation of my matrix dryer and shrinker, the outside housing being broken away to show the interior structure and arrangement of parts;

Fig. 2 is a vertical section on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary section showing part of the pulsating mechanism taken on line 3—3 of Fig. 1;

2

Fig. 4 is a fragmentary sectional view of the same mechanism taken on a vertical plane normal to the plane of Fig. 3 and thus corresponding to the line 4—4 of Fig. 3; and

Fig. 5 is a view in perspective of my complete matrix drier and shrinker.

A blower, or air-exhausting means 10 (see Figs. 1 and 2), has vacuum manifolds or ducts 11 and 12 which are connected to the vacuum chamber 13. The blower 10 has a discharging outlet at the bottom (not shown) from which the air and moisture withdrawn from the vacuum chamber 13 escapes, and the blower is provided with the usual exhaust fan which is driven by a motor 14.

The vacuum chamber 13 has a curved, perforated top wall 15 (Fig. 2) on which the matrix 16 is supported. A pair of side holding bars 17 extend in parallel horizontal position on top of the vacuum chamber 13 along each side respectively, parallel to the axis of curvature of the perforated top 15 of the vacuum chamber (Fig. 2). These bars engage and hold the opposite straight edges of the matrix 16 on the vacuum chamber. These side holding bars 17 are connected to pairs of rocker arms 18, each of which is pivotally supported on a suspension bracket 19 secured to the bottom of the vacuum chamber 13. The function and operation of the side holding bars 17 are more fully described in my previously mentioned copending application Serial No. 662,241. A link 20, pivotally connected to the bottom of each rocker arm 18, has its inner end pivotally mounted on a vertical rod 21. Each vertical rod 21 is slidably mounted for vertical up and down movement and a spring 22 on each rod 21 tends to keep the rods in raised position and thus, as apparent from Fig. 2, tends to cause the side holding bars 17 to press against the lateral edges of the matrix 16 and exert some degree of lateral compression on the matrix. A horizontal connecting foot bar 23 (Fig. 1) joins the bottom ends of the vertical rods 21 to enable the operator to depress the rods 21 by pressing on the foot bar 23, thus enabling the side holding bars 17 to be moved outwardly away from the matrix whenever the matrix is to be set in place on the vacuum chamber or removed therefrom. The housing of my device is provided with a suitable cut-out portion 24 at the bottom of the front wall, as shown in Fig. 5, to permit access to the foot bar 23.

In order to enable a pulsating vacuum pressure to be exerted on the matrix when positioned on the perforated top wall of the vacuum chamber, I provide a pivotally mounted shutter

or butterfly valve 25 in each of the manifolds 11 and 12 of the blower 10. Each of these shutters 25 is rigidly mounted on a supporting shaft 26, rotatably journaled in the manifold housing. A crank arm 27 is secured to the end of each shaft 26 outside of the housing of the manifolds, and a link 28 connects the two crank arms 27 to produce simultaneous movement of both shutters. The crank arms 27 are identical in length so that both shutters are given an equal rotation, and the shutters are so arranged that they will thus be opened or closed simultaneously. A second crank arm 29 is mounted on one of the shutter shafts (thus the one shown on the right in Fig. 1), (or a bell crank may be attached to this shaft in place of the two crank arms). A link 30 joins this second crank arm 29 to a plunger 31, slidably mounted for reciprocal vertical movement within a guide 32. A lower link 33 connects the bottom of the plunger 31 to a crank pin 34 mounted on the end of a shaft 35.

The motor 14, which drives the blower fan through the medium of a connecting belt 36, also has a drive shaft 37 coupled to the motor at 38. The shaft 37 is connected to a counter shaft assembly 39 by a belt 40, and the countershaft assembly 39 in turn, through the medium of belt 41 and suitable reduction pulleys, drives the shaft 35.

Thus the operation of the motor 14 not only causes air and moisture to be drawn from the vacuum chamber 13 and exhausted from the bottom of the blower, but also causes the shutters 25 in the manifolds 11 and 12 to be opened and closed rapidly and continuously, thus resulting in the desired pulsating vacuum suction in the chamber 13 and thus on the matrix. Suitable stops or valve seats 42 (Fig. 1) of rubber or similar resilient material may be placed in the manifolds 11 and 12 to facilitate noiseless operation of the shutters 25.

Suitable heating elements 43 are located in the top of my device so as to be positioned above the matrix while the matrix is held in place on the perforated top of the vacuum chamber. Preferably as heating elements I employ infrared lamps, as described in my co-pending application Serial No. 662,241. These heating elements are removably mounted in the top 44 of the housing of my device, and the housing also has the usual hinged door 45 to enable the matrix to be easily inserted or removed from the device.

Various other mechanical means could of course be employed for producing the pulsating vacuum to which the matrix is subjected. The means which I have described and illustrated is very simple and practical, but it is not my intention to limit my invention to the use of this or any other particular means, inasmuch as my purpose can be achieved with other devices without departing from the principle of my invention.

I claim:

1. In a matrix drier and shrinker, a vacuum chamber, a perforated matrix-supporting wall on said vacuum chamber, an air-exhausting blower connected to said chamber, means interposed between said blower and said chamber for causing rapidly recurring interruptions in the passage of air from said chamber to said blower, whereby to cause a rapidly pulsating vacuum pressure to be exerted on the matrix when said matrix is placed on said perforated wall for the purpose described, and heating elements for applying heat to the matrix while the matrix is in position on said wall.

2. A matrix drier and shrinker including a vacuum chamber having a perforated, matrix-supporting wall, air exhausting means connected to said chamber, mechanically-operated means interposed between said air exhausting means and said chamber for causing rapidly recurring interruptions in the passage of air from said chamber to said air exhausting means, whereby to cause a rapidly pulsating vacuum pressure to be exerted on the matrix for the purpose described when said matrix is placed on said wall, a pair of bars movably positioned on said wall and adapted to engage opposite lateral edges of the matrix on said wall, pressure means connected with said bars for causing said bars to exert inward lateral pressure on the edges of the matrix, and heating elements for applying heat to the matrix while the matrix is positioned on said wall.

3. The improved method of obtaining maximum shrinkage in a stereotype matrix during the drying of the same which method includes providing a vacuum chamber with a perforated matrix-supporting wall and with air exhausting means connected with said chamber, providing means for producing rapidly recurring interruptions in the passage of air from said chamber to said air exhausting means, placing said matrix on said wall and operating said air exhausting means so as to cause a moderate vacuum pressure to be exerted on said matrix sufficient to hold said matrix against said wall and simultaneously operating said air interrupting means to cause rapid pulsations in said vacuum pressure exerted on said matrix, subjecting two opposite edges of said matrix to inwardly directed predetermined lateral pressure while said matrix is subjected to the pulsating vacuum pressure, and simultaneously subjecting the exposed face of said matrix to heat.

4. The improved method of obtaining maximum shrinkage in a stereotype matrix during the drying of the same which method includes providing a vacuum chamber with a curved, perforated matrix-supporting wall and with air exhausting means connected with said chamber, providing means for producing rapidly recurring interruptions in the passage of air from said chamber to said air exhausting means, placing said matrix on said wall and operating said air exhausting means so as to cause a moderate vacuum pressure to be exerted on said matrix sufficient to hold said matrix against said wall and simultaneously operating said air interrupting means to cause rapid pulsations in said vacuum pressure exerted on said matrix, subjecting the two opposite straight edges of said matrix to inwardly directed predetermined lateral pressure while said matrix is subjected to the pulsating vacuum pressure, and simultaneously subjecting the exposed face of said matrix to infrared heating rays.

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