Nov. 23, 1948. W. T. MOIR 2,454,334

MATRIX PRE-DRIER

Filed June 4, 1947 2 Sheets-Sheet 1

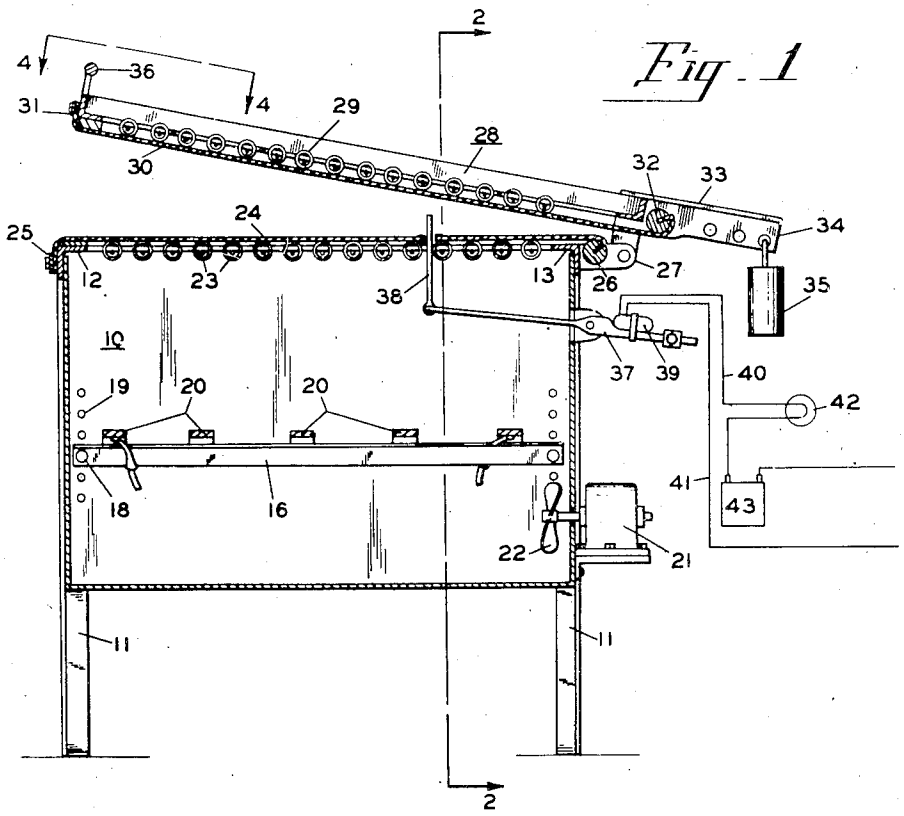


Fig. 1

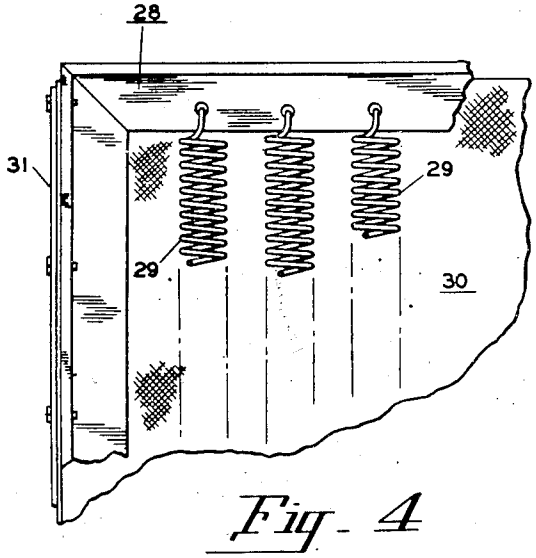


Fig. 4

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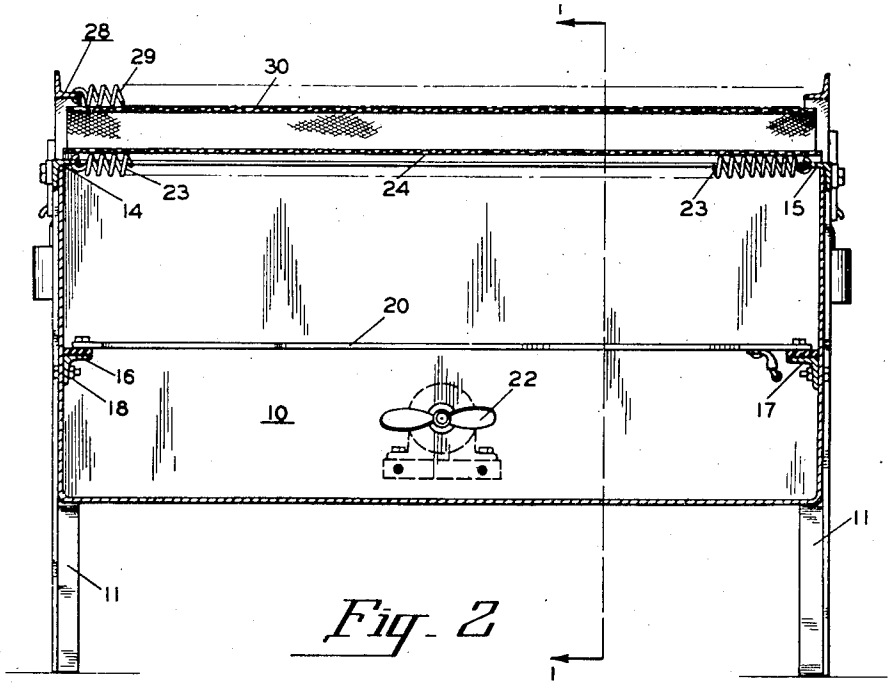


Fig. 2

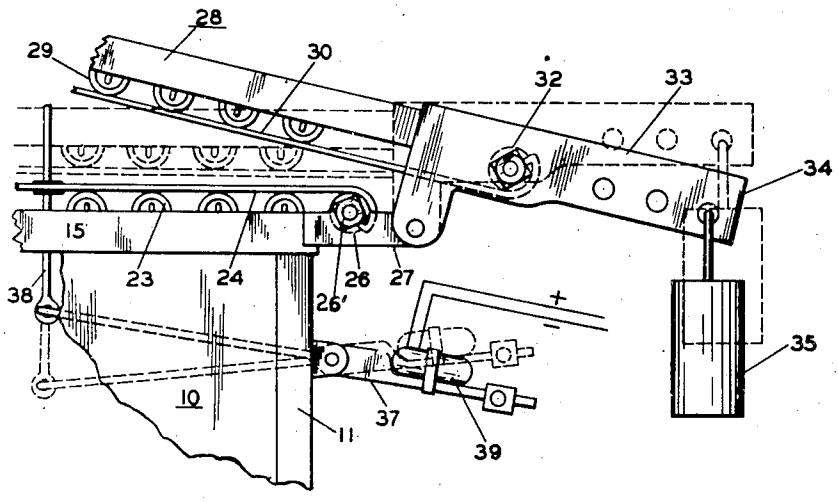


Fig. 3

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MATRIX PREDRIER

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5 Claims. (Cl. 34—143)

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This invention relates in general to the treatment of stereotype matrices used for the casting of stereotype plates for newspaper presses and the like.

As is well known, the matrix, which is composed largely of paper pulp, receives the impression from the type while the matrix is in very moist condition and while the matrix is flat. After receiving such impression, the matrix is subjected to a shrinking, drying and forming treatment after which the matrix then is used as a mold for the casting of a semi-cylindrical stereotype plate.

It is common practice for the final drying and forming of the matrix to take place on a drying and forming machine in which the matrix is held against a semi-cylindrical forming element, or held between two semi-cylindrical forming elements, and subjected to the necessary drying heat, and also generally to an induced vacuum, until the forming and drying have been completed and the matrix is in condition to serve as a mold for the molten metal from which the stereotype plate is to be made.

While the matrix may, after receiving its impression from the type, be immediately placed in such final drying and forming machine, it is preferable first to provide for shrinking as well as some amount of pre-drying of the moist, soft matrix before being subjected to final drying and forming. It is this shrinking and pre-drying of the matrix, in preparation for the final drying and forming, with which the present invention is specifically concerned.

Some of the pre-dryers currently in use for this purpose include a flat, perforated metal plate, covered with asbestos or other material, on which the matrix is supported, or may include a pair of perforated metal plates, with their inner faces covered with such material, the matrix being placed between them while subjected to some pre-drying heat.

It is necessary, even in the early stages of shrinking and pre-drying, to subject the matrix to some pressure to resist any tendency to buckle or warp, but too much pressure on the soft, moist matrix will injure the impressions which have been made in the matrix and which are to be reproduced in the stereotype plate through the medium of the matrix. I have found that with the use of perforated metal plates during the pre-drying stage there is considerable difficulty in avoiding having some of the surface variations or raised portions of the matrix subjected to too much pressure, while still maintaining sufficient pressure to hold the matrix in proper position.

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One of the objects of this invention is to provide an improved shrinker and pre-dryer for a matrix in which the use of such perforated metal plates will be eliminated.

Another object of this invention is to provide an improved shrinker and pre-dryer for a matrix in which the matrix will be held flat while subjected to a predetermined pre-drying treatment.

A further object is to provide an improved shrinker and pre-dryer in which the pressure imposed upon the matrix can be easily adjusted.

An additional object of this invention is to provide a shrinker and pre-dryer having heating elements which will operate automatically when a matrix is placed in the pre-dryer.

A still further object is to provide an improved shrinker and pre-dryer for matrices which will be simple and inexpensive to construct and which will require a minimum amount of attention in its operation and maintenance.

I attain these objects and other incidental advantages by constructing my shrinker and pre-dryer in the manner hereinafter briefly described with reference to the accompanying drawings, in which:

Fig. 1 is a transverse sectional elevation through my pre-dryer taken on a plane corresponding to the line 1—1 of Fig. 2 and showing the pre-dryer in partial open position;

Fig. 2 is a sectional elevation taken at right angles to Fig. 1, the section corresponding to line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary side elevation of one of the hinged arms on which the top portion of the pre-dryer is mounted; and

Fig. 4 is a fragmentary plan view of a portion of the top or cover of the pre-dryer taken on the line 4—4 of Fig. 1.

As indicated in Figs. 1 and 2, my pre-dryer includes a box-like housing indicated in general by the reference character 10, having four side walls and a bottom wall, but having the top open. The housing is of metal. However, if desired, the bottom wall may include a plate of refractory glass for the purpose of reflecting the heat upwardly when heat is generated within the housing.

The housing 10 is secured to upright angle iron members 11 at the four corners and these members extend down below the bottom of the housing and constitute the four legs on which the entire device is supported. Similar angle iron members 12, 13, 14 and 15 extend over the four

edges at the open top of the housing, thus reenforcing the top portions of the four side walls of the housing.

A pair of angle iron brackets 16 and 17 are mounted horizontally on the inside of two of the opposite walls of the housing 10, as shown in Fig. 2, and are attached to the walls preferably by bolts 18. Also, preferably, these two side walls are provided with a plurality of small bolt holes 19 (Fig. 1) in vertical rows in order that the height of the brackets 16 and 17 may be adjusted as desired. The two brackets 16 and 17 support a series of electrical heating elements 20 which are electrically connected, through suitable conductors, to a source of electrical energy (not shown) located outside of the pre-dryer. These heating elements 20 are of well known construction and need not be further described. Due to the fact that the brackets 16 and 17 are adjustable as to height these heating elements 20 can be positioned at any desired distance below the top of the housing 10. A small electric motor 21, supported on a bracket attached to the outside of housing 10, drives a shaft extending through an opening in the lower portion of one of the side walls and rotates a fan blade 22 carried on the inner end of the shaft. The fan 22 is a very small one and its purpose is merely to provide enough agitation of the heated air within housing 10 to insure a uniform distribution of heat over the surface of the blanket on which the matrix is supported at the top of the housing as hereinafter described.

A plurality of similar helical springs 23 are stretched under tension in parallel horizontal arrangement between the angle iron members at the top of two of the sides of the housing, the ends of these springs being held respectively in holes provided in the opposite angle iron members. An asbestos blanket 24 is stretched over the tops of these springs 23, extending transversely with respect thereto, and is stretched over the entire top of the housing. One end of this asbestos blanket 24 is secured between a metal clamping strip 25 (Fig. 1) and the top angle iron 12 at the front of the housing. The opposite end of the asbestos blanket 24 is attached to a roller 26. The ends of this roller 26 are secured to stub shafts which extend through a pair of horizontal bracket extensions 27 (see also Fig. 3), which in turn are welded or otherwise securely attached to the side angle iron members in the top of the housing. The ends of the stub shafts are threaded and are provided with clamping bolts 26' so that the roller can be firmly clamped against rotation and will thus hold the asbestos blanket 24 under tension.

The asbestos blanket 24 is preferably woven with metal strands to give it added tensile strength and is made strong enough to withstand considerable tension even when wet and hot. While other materials might be used for this blanket or top covering I have found that a blanket or sheet woven with asbestos strands is most satisfactory.

My pre-dryer is provided with a hinged cover, indicated in general by the reference character 28. This cover includes a rectangular frame formed of four angle iron members, the size of the frame corresponding approximately to the size of the top of the housing 10. The frame of the cover is rigidly attached at the rear side to a pair of hinge arms 33 (Figs. 1 and 3) which are L-shaped and are pivotally mounted on the two bracket extensions 27 respectively.

Helical springs 29, similar to the springs 23 previously described, are similarly stretched under tension between the angle irons at the opposite sides of the frame of the cover 28, and are so arranged as to be parallel to the springs 23 when the cover is in closed or lowered position. An asbestos blanket 30, similar to the asbestos blanket 24, is stretched across the cover over the underside of the springs 29. The front end of this blanket 30 is secured between a clamping strip 31 and the adjacent angle iron member of the cover frame. The opposite end of the asbestos blanket 30 is secured to a roller 32, similar to roller 26, and the roller 32 is attached to stub shafts mounted in the hinge arms 33 and adapted to be clamped to the hinge arms 33 by suitable nuts, in the same manner as roller 26 previously described, so as to hold the roller 32 against rotation and thus keep the asbestos blanket 30 under tension. The cover 28 is so mounted on my device that when the cover is lowered in position the two asbestos blankets 24 and 30 will be in adjacent superimposed horizontal planes. The two hinge arms 33 have rearwardly extending portions 34 to which counterweights 35 are adjustably attached. The weights 35 are preferably so positioned that the cover 28 will remain in either raised or lowered position. The position of these weights 35 will also determine the pressure with which the cover 28 will rest on top of the blanket 24 at the top of the housing 10. A handle 36 is provided at the front of the cover as a convenience in raising or lowering the same.

A switch arm 37 pivotally mounted on a bracket secured to the outside of the housing 10, and so mounted as to swing up and down in a vertical plane, extends through a narrow vertical slot in the housing wall. To the inner end of this arm 37 an upwardly extending rod 38 is pivoted. This rod 38 extends upwardly through a small perforation in the lower asbestos blanket 24. On the outer end of this switch arm 37 a mercury switch 39, of ordinary construction, is mounted. Also the outer end of the switch arm 37 is so weighted that when the cover 28 is in the raised position shown in Figs. 1 and 3, provided no matrix is resting on the lower blanket 24, the rod 38 will move upwardly and cause the mercury switch 39 to move to lower or "off" position. However, a slight downward pressure on the top of the rod 38, such as would be occasioned by placing a matrix on top of the lower blanket 24, is sufficient to cause the rod 38 to be pushed into lower position and thus to cause the mercury switch 39 to be raised to upper or "on" position.

As indicated in Fig. 1, the mercury switch 39 is interposed between a pair of branch wires 40 and 41. These branch wires are connected to a main magnetic switch (not shown), of well known construction which in turn controls the passage of electric energy to the heat elements 20 and to the fan motor 21. A signal light 42 and an electric time alarm signal, indicated at 43, are also connected on the same branch line with the mercury switch 39. These various electrical elements are so arranged that when the rod 38 is pressed down and the mercury switch 39 consequently is raised to the upper or "on" position, the signal light 42 will be lighted, the time alarm signal 43 will be set, and the main switch, controlling the passage of current to the heating elements 20, will be closed and thus cause the heating elements to be energized and the motor 21 to start operation of the fan 22.

My device works as follows: the moist matrix, after receiving the necessary impressions from the type, etc., is placed on the asbestos blanket **24** while the top **28** is in raised position. The top **28** is then lowered until the upper blanket **30** rests on top of the matrix. The placing of the matrix on the lower blanket **24** will cause the rod **38** to be pushed down and thus will raise the mercury switch **39** to the "on" position. Immediately the heating elements **20** will start heating the air within the housing **10**. The matrix will be held flat between the two asbestos blankets **24** and **30** extending below and above the matrix over the entire matrix surface. The pressure exerted on the two faces of the matrix (which pressure can be adjusted by changing the position of the counterweights **35** as previously mentioned) will be sufficient to prevent any buckling or warping of the matrix but will not be sufficient to impair any impressions which have been made in the matrix. While the two asbestos blankets **24** and **30** are held in substantially flat planes, both by their tension and by the tension of the respective sets of springs against which they rest, nevertheless any surface variations in the matrix will be accommodated by the resilient surfaces presented by the blankets without permitting any portion of the matrix to warp or buckle. Since the matrix will be subjected only to the minimum pressure required to hold the matrix against warping or buckling there will also be only minimum resistance to the lateral shrinking of the matrix during this pre-drying, and lateral shrinkage during the drying of the matrix is most desirable as is well known. The woven asbestos blankets **24** and **30** not only do not store moisture received from their contact with the moist matrix, but in addition to permitting free evaporation of such moisture also permit air to reach the matrix surfaces. The supporting springs **23** below the asbestos blanket **24** permit the heated air from within the housing **10** to pass with practically no hindrance to the blanket **24**, and the hot air currents pass thence through blanket **24** to the matrix. At the same time the tension of the springs **23** prevents any sagging of the supporting blanket **24** and thus keeps the matrix flat. Moisture from the heated matrix also passes through the upper blanket **30** and is quickly dissipated from the upper blanket since the upper springs **29**, as apparent, offer much less hindrance to the evaporation of moisture upwardly from the matrix and upper blanket than occurs in the case of the perforated metal plates which have heretofore been similarly employed.

Preferably the matrix is placed face down on the lower blanket **24**. Since the face is the denser side of the matrix this position of the matrix brings the denser side against the heated lower blanket and allows moisture to escape through the opposite side and upper blanket. From my experience and experiments I believe it is preferable, particularly in the pre-drying of the matrix, to have the heat delivered against one face only, i. e., against the denser side, than against both faces. When heat strikes against both faces of the soft moist matrix in the pre-drying stage moisture pockets or "blisters" might be developed in the matrix.

The slight agitation of the heated air set up within housing **10** by the fan **22** which causes the heat to be distributed uniformly over the bottom blanket **24** also promotes uniform shrinking of the matrix by the uniform distribution of the heat and the uniform evaporation of moisture upward-

ly through the upper blanket and past the upper set of stretched springs.

The arrangement and adjustable position of the heating elements **20**, together with the operation of fan **22**, enable more efficient use to be made of the controlled heating developed in the interior of the housing **10**. As a result my device makes a very economical use of the energy required for the pre-drying and shrinking. A load of 3000 watts is all that is required in the device illustrated for pre-drying and shrinking a matrix for an ordinary stereotype newspaper plate. Finally the timing and signal devices associated with my pre-dryer insure a definite pre-drying treatment for the matrix while requiring the exercise of only a minimum amount of care and attention on the part of the operator.

It would be possible of course to make many modifications in the simple pre-dryer which I have described without departing from the principle of my invention, but the particular form in which I have shown my pre-dryer in the drawings I have found to be most practical and satisfactory.

I claim:

1. In a matrix dryer of the character described, a housing open at the top, heating means within said housing, spring elements stretched across the top of said housing, a matrix-supporting sheet of material stretched across the top of said housing and over the tops of said spring elements, a matrix-retaining cover member, means for hingedly mounting said cover member to the housing above said matrix-supporting sheet of material, said cover member including a frame, spring elements stretched across said frame, and a second sheet of material stretched across said cover below said second-mentioned spring elements, said cover member so arranged that, when a matrix is placed on said first-mentioned sheet and said cover member is then closed, the second sheet will rest against the upper face of the matrix.

2. In a matrix dryer of the character described, a housing open at the top, heating means within said housing, spring elements stretched horizontally across the top of said housing, a matrix-supporting blanket of woven material stretched across the top of said housing and over the tops of said spring elements, a matrix-retaining cover member, means for hingedly mounting said cover member to the housing above said matrix-supporting sheet of material, said cover member including an open frame of approximately the same size as the top of said housing, spring elements similar to said first-mentioned spring elements stretched across said frame, and a second blanket similar to said first-mentioned blanket stretched across said cover member below said second-mentioned spring elements.

3. In a matrix dryer of the character described, a housing having closed bottom and sides but open at the top, heating means within said housing, spring elements stretched across the top of said housing, a matrix-supporting blanket of porous material stretched across the top of said housing and over the tops of said spring elements, means for adjusting the tension of said stretched blanket, a matrix-retaining cover member, means for hingedly mounting said cover member to the housing above said matrix-supporting sheet of material, said cover member including an open frame, spring elements stretched across said frame from one side to the other, a second blanket similar to said first-mentioned blanket stretched across said cover member below said second men-

tioned spring elements, means for adjusting the tension in said second blanket, said cover member so arranged that, when a matrix is placed on said first-mentioned blanket and said cover member is then closed, the second blanket will rest against the upper face of the matrix.

4. In a matrix dryer, a housing open at the top, heating means adjustably positioned within said housing, an air-agitating fan in said housing, spring elements stretched horizontally across the top of said housing, a matrix-supporting blanket of material including asbestos stretched across the top of said housing and over the tops of said spring elements, a matrix-retaining cover member, means for hingedly mounting said cover member to the housing above said matrix-supporting sheet of material, said cover member including a frame of approximately the same size as the top of said housing, spring elements similar to said first-mentioned spring elements stretched across said frame from one side to the other, a second blanket of asbestos material similar to said first-mentioned blanket stretched across said cover member below said second-mentioned spring elements, said cover member so arranged that, when a matrix is placed on said first-mentioned blanket and said cover member is then closed, the second blanket will rest against the upper face of the matrix, and counter-balancing means for said cover member whereby the pressure of said second blanket on the matrix when said matrix is resting on said first-mentioned blanket can be adjusted.

5. A matrix dryer of the character described including a housing having closed bottom and sides but open at the top, heating means adjustably positioned within said housing, an air-agitating fan in said housing below said heating means, spring elements stretched horizontally across the top of said housing, a matrix-supporting blanket of

woven material including asbestos stretched across the top of said housing and transversely over the tops of said spring elements, means for adjusting the tension of said stretched blanket, a matrix-retaining cover member, means for hingedly mounting said cover member to the housing above said matrix-supporting sheet of material, said cover member including an open frame of approximately the same size as the top of said housing, spring elements similar to said first-mentioned spring elements stretched across said frame from one side to the other, a second blanket of asbestos stretched across said cover member below said second-mentioned spring elements, means for adjusting the tension in said second blanket, said cover member so arranged that, when a matrix is placed on said first-mentioned blanket and said cover member is then closed, the second blanket will rest against the upper face of the matrix, and adjustable counterbalancing means for said cover member whereby said cover member can be held in raised position and whereby the pressure of said second blanket on the matrix when said matrix is resting on said first-mentioned blanket can be adjusted.

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