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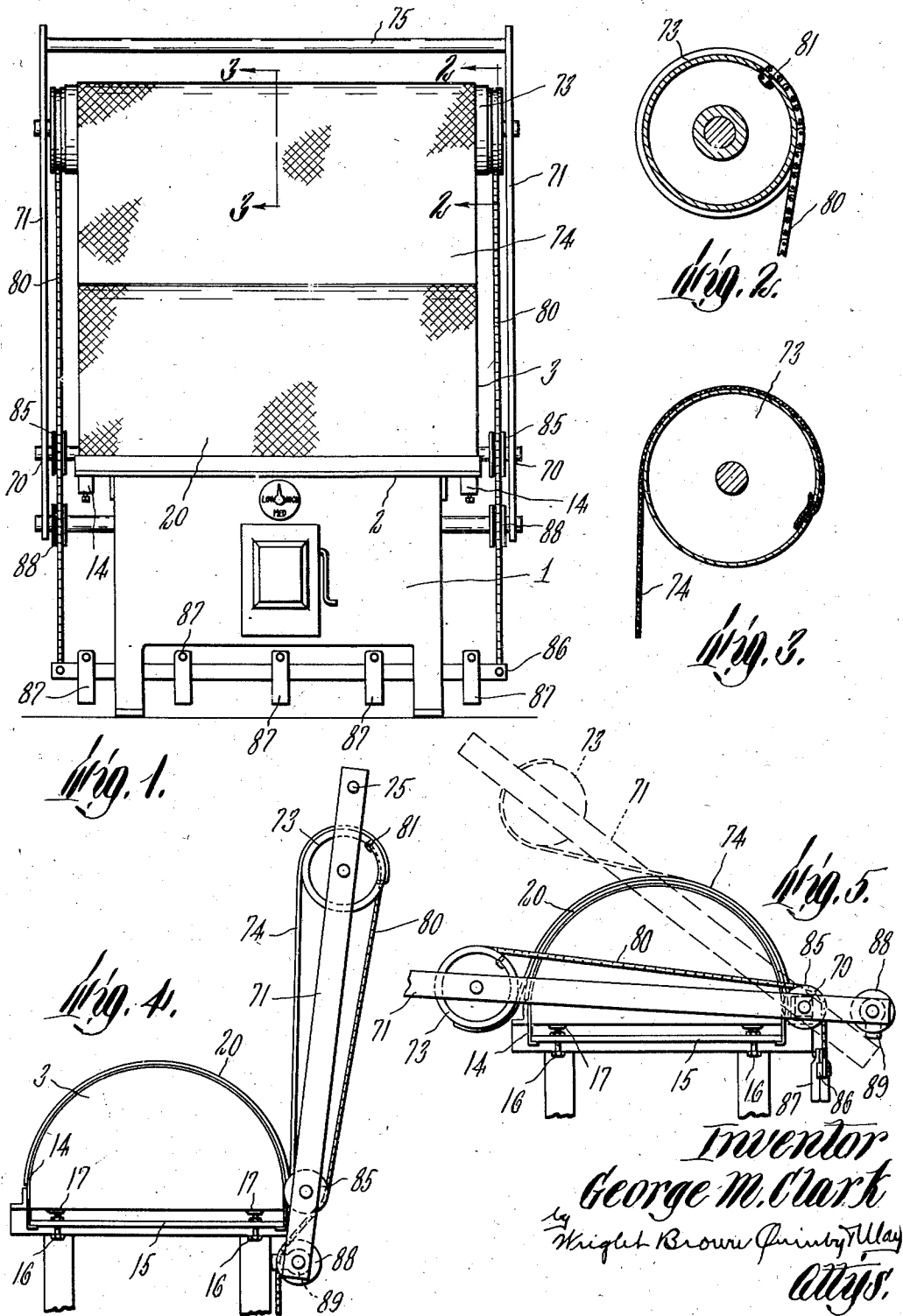
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MATRIX FORMING AND DRYING MACHINE

Filed Oct. 1, 1934

2 Sheets-Sheet 1



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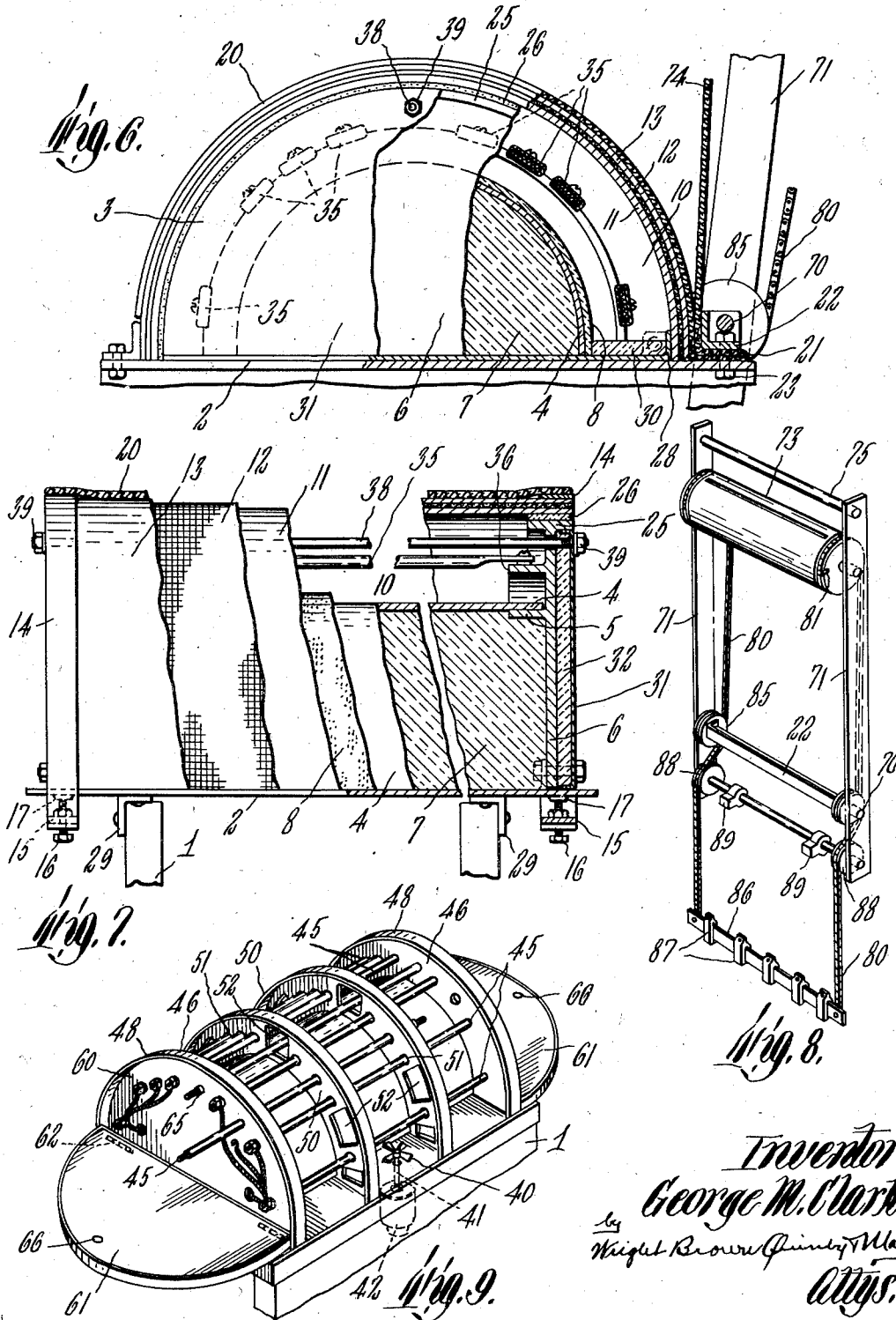
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UNITED STATES PATENT OFFICE

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MATRIX FORMING AND DRYING MACHINE

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10 Claims. (Cl. 34-16)

In the formation of stereotype matrices, the type as set in flat form as by the linotype machine is impressed in the damp matrix material which must thereafter be curved to the general contour of the press cylinder and dried out in order to harden it. Since the matrix after the type has been impressed therein is somewhat soft and flabby it must be supported over substantially its entire area in curved form when it is being dried in order that the surface of the stereotype plate made therefrom may have the proper contour to print uniformly over its printing surface.

An object of the present invention, therefore, is to provide a machine by which the damp matrix may be easily and quickly curved to proper form and there held and dried.

A further object is to provide a machine in which the drying shall proceed uniformly to avoid distortion of the matrix produced by non-uniform drying or "streak heat".

A further object is to provide an attachment which may be applied to machines already on the market for facilitating the curving of the matrix and the holding of it in proper shape while it is being dried.

Further objects and advantageous constructions will be apparent from a more complete description of an embodiment of this invention shown in the accompanying drawings in which Figure 1 is a front elevation of a machine embodying this invention.

Figures 2 and 3 are detail sections on the correspondingly numbered section lines of Figure 1.

Figure 4 is an end elevation of the upper portion of the machine in its open position ready to receive a matrix to be curved and dried.

Figure 5 is a view similar to Figure 4, but showing the machine closed.

Figure 6 is a vertical section crosswise of the drying mechanism.

Figure 7 is a front elevation of the same broken away to illustrate the interior construction.

Figure 8 is a perspective showing the blanket mechanism which may be used as an attachment for forming and drying machines previously on the market.

Figure 9 is a perspective of the drying mechanism, parts being removed and showing a modification.

Referring first to Figure 1, at 1 is indicated a stand or table of any suitable description on the top 2 of which is supported a drier member

3. This drying member presents a convex cylindrical surface for supporting the matrix to be dried, and as shown the member is substantially semi-cylindrical though it might be any portion of a cylinder of sufficient extent to take the matrix thereon and impart the desired extent of curvature thereto. As shown best in Figures 6 and 7 this drying member comprises an inner semi-cylindrical metallic shell 4 which may be supported on oppositely disposed and inwardly facing arcuate flanges 5 of end plates 6. The space between this plate 4 and the table top 2 is preferably packed with heat insulating material such as mineral wool as at 7. Over this plate 4 is shown positioned a layer of asbestos paper or fabric 8 which forms the inner wall of a semi-tubular chamber 10. The outer wall of this chamber is shown as formed of a curved metallic plate 11 presenting a convex semi-cylindrical face, over which is placed a reticulated metallic layer 12. Over this layer 12 is positioned a sheet metal plate 13. This plate 13 and the reticulated layer 12, which may be a wire screen, are held together by curved metallic clamping straps 14 at opposite side edges. As shown best in Figure 5 the ends of the straps 14 may be brought down and secured to the under face of the transverse bars 15 through which are passed screws 16, the inner end of each of which abuts a seat member 17 on the under side of the table top 2. By turning the screws 16 inwardly the bars 15 are forced downwardly, bringing the clamping straps 14 into firm clamping engagement with the plate 13 and holding it and the screening 12 firmly in position. Over this plate 13 may be laid a blanket 20 of asbestos cloth or the like. Preferably this blanket material is fabricated with a fine bronze wire reinforcing which serves to strengthen the blanket and hold it firmly in woven condition. One end of this blanket may be turned outwardly as shown at 21 (see Figure 6) and be clamped in position to the upper face of the table top 2 as by means of an angle member 22 which may be secured by means such as nuts and bolts at 23. This angle member 22 may also have another function as will later appear.

The end wall members 6 are shown as provided with flanged margins as at 25 to receive the side edge portions of the elements 11, 12, 13, and 14 and a gasket strip 26 of asbestos fabric or paper may be placed between this flange 25 and the inner face of the plate 11. The lower edges of the plate 11 may be secured to the upwardly flanged ends 28 of the table

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top 2 which may be reinforced longitudinally as by the angle members 29, and insulating material 30 such as mineral wool, asbestos paper, or the like, may be positioned in the lower end portions of the chamber 10. Spaced outwardly from the plates 6 are cover plates 31 and the space between the plates 6 and 31 may be filled with heat insulating material 32.

This chamber 10 is designed to house heating elements herein shown as electric heating units 35. They may, if desired, be supported on arcuate flanges 36 extending inwardly from the end walls 6, which also may be tied together at intervals by the tie rods 38 provided with nuts 39 on their outer ends. These electric heating units may be connected up to be energized as desired in order to produce any desired distribution of heat, some or all being used as desired, or all may be employed at once, provided some type of voltage control is used to regulate the amount of heat developed. For example, where these units are heated with alternating current, a transformer with windings of various ratios may be employed so that the voltage impressed thereon may be varied in accordance with the selected winding. It has been found in practice that the use of the reticulated layer 12 between the inner and outer metal plates 11 and 13 serve to more evenly distribute the heat received initially from the plate 11, over the area of the plate 13 so that while the plate 11 may be locally heated by those heating elements in proximity thereto which are energized, the screening 12 serves quite effectually to distribute this over a much larger area to the plate 13. Even with this arrangement, however, it is sometimes found that the heating may be somewhat localized adjacent to the particular heating units energized, causing what is known as "streak heat", that is, heat which dries the matrix in longitudinal zones and causes more or less distortion which interferes with proper alinement of the lines of printing in the stereotype plate made therefrom.

In order to eliminate streak heating entirely, provision may be made, as shown in Figure 9, for recirculating the air within the semi-circular heating chamber. Referring to this figure, it will be seen that a circulating fan 40 may be positioned within the chamber, this being rotated through a shaft 41 extending from a small motor 42 which may be hung or otherwise supported beneath the table top 2. Figure 9 also shows a further modification which facilitates the removal or replacement of heating units which are liable to burn out after some time of use. Referring to this figure, the heating units 45 which are what is known as pencil units, are in the form of cylindrical rods of considerable length. They may be mounted in holes through the end frame members 46 and in order to aid in supporting and guiding these units when they are being inserted in position, there may be employed semi-annular supporting members 50 positioned between the end plates 46. These may be provided with openings such as 51 through which the units may be pushed, being inserted from one end, and, particularly where a circulating fan 40 is employed, they should be provided with openings 52 to permit circulation of air therearound. The end plates 46 are shown also as having outwardly directed marginal flanges 48 on which the covering layers 11, 12, and 13 may be secured and which form marginal projecting edges for end receptacles 60 within which may be housed the various electrical connections to the heating units.

These end receptacles may be closed when in service by covers 61 which may, if desired, be hinged as at 62 so that they may be opened to provide access to the ends of the heating units, but may be closed when the drier is in operation. They may be secured closed by being secured to the ends of a tie rod 65 which passes through the end plates 46 and the various intermediate partitions and may pass through holes 66 in the covers 61.

In order to retain the matrix in curved position in contact with the blanket 30, mechanism shown detached in Figure 8 may be employed and this mechanism may, if desired, be employed as an attachment to other matrix drying machines of the general type hereinbefore described having a curved surface against which the matrix may be supported while it is being dried. This mechanism includes the angular element 22 to which reference has heretofore been made, this angular element having pivoted on journals 70 at opposite ends thereof, a pair of side frame members 71 spaced wider than the length of the drier member. Between these members 71, and in parallel relation to the angle member 22, is journaled a drum 73 on which is wound the end portion of a blanket 74 which is preferably formed of asbestos reinforced with fine wire as previously described and which is sufficiently porous to permit the escape of steam from the matrix as it is being dried. The opposite end of the blanket 74 is shown as secured to the angle member 22, and said securing may be effected, if desired, by the bolts 23 which are employed to clamp the member 22 to the drier drum. The frame member 71 may be extended beyond the drum 73 and be provided with a cross handle member 75 by which the frame may be manipulated so as to swing it down from the open position shown in Figures 4 and 6 to the closed position shown in Figure 5 during which the blanket 74 is wrapped progressively about the blanket 20, the blanket 74 unwinding somewhat from the drum as the frame is brought down and the side frame members are brought down across the ends of the drier chamber.

In order to hold the blanket 74 taut so that it may press the matrix which is laid upon the blanket 20 firmly thereagainst to take the curved contour thereof, provision is made for holding the blanket 74 under tension between the drum and its clamped end at the angle member 22, such means acting yieldingly to rotate the drum 73 in a direction to wind the blanket 74 thereon. As shown, such means comprises a pair of flexible elements such as chains 80, one end of each being secured in any suitable way as at 81 to the drum 73 beyond the sides of the blanket 74 and beyond the ends of the drying drum on which the matrix is placed, as is shown in Figure 1. These chains 80 are shown as passed about pulleys 85 which may be journaled on the pivots 70, and to the lower ends of these chains may be fixed a cross bar 86 on which may be hung weights 87, these being of sufficient aggregate weight to hold the blanket 74 sufficiently taut and to partly counterbalance the weight of the frame, particularly when it is in intermediate position such as is shown in dotted lines in Figure 5, thus to facilitate the rocking of this frame between its substantial upright and horizontal positions. These weights are more effective as a counterbalance when the frame is partly raised and tend to move the frame to its upright position shown in Figure 4 when the frame has been partly raised.

The lower ends of the frame side members 71 may be provided with stops 89 which may contact with the support 1 when the frame is in its raised or open position, as shown in Figure 4, and in this position of the parts the chains 80 may bear over pulleys 88 journaled at the lower ends of these frames, as shown in Figure 4. The angular positions of the chains about these pulleys 88 in this position of the frame tend to relieve the counterbalancing effect, thus to ease the final upward motion of the frame so that it reaches its open position without undue shock. The chains are wound about the drum 73 in the opposite direction to the blanket 74 so that as they unwind the blanket is wound.

From the foregoing description of certain embodiments of this invention, it should be evident to those skilled in the art that various changes and modifications might be made without departing from the spirit or scope of this invention as defined by the appended claims.

I claim:

1. A matrix drier presenting a semi-cylindrical drying surface, a heat insulating lining spaced inwardly of said surface to form a semi-annular chamber, heating elements within said chamber, and means for recirculating air in said chamber.

2. A matrix drier presenting a semicylindrical drying surface, a heat insulating lining spaced inwardly of said surface to form a semiannular chamber, heating elements within said chamber, means for holding a matrix against said drying surface, and a fan in said chamber for circulating the air therein.

3. A matrix drier having a drying portion presenting a curved outer face, a frame having side members spaced wider than the axial length of said portion, means supporting said frame to permit said side members to be brought across the ends of said portion, and a blanket member positioned between said side members and yieldable to progressively wrap about said face as said frame is brought across the ends of said portion.

4. A matrix drier having a drying portion presenting a curved outer face, a frame having fixedly spaced members pivoted on an axis substantially parallel to the axis of curvature of said drying portion, and a blanket carried by said frame in position to be progressively wrapped about or unwrapped from said face on swinging of said frame about its axis.

5. A matrix drier having a drying portion presenting a curved outer face, a frame pivoted on an axis substantially parallel to the axis of curvature of said drying portion, a blanket having an edge portion secured to an edge of said drying portion adjacent to said frame axis, a rotary drum carried by said frame spaced from and parallel to said frame axis and about which said blanket is wound, and a yielding means tending to rotate said drum to wind said blanket thereon.

6. A matrix drier having a drying portion presenting a curved outer face, a frame pivoted on an axis substantially parallel to the axis of curvature of said drying portion and a blanket having an edge portion secured to an edge of said drying portion adjacent to said frame axis, a rotary drum carried by said frame spaced from and parallel to said frame axis and about which said blanket is wound, chains secured to and wound

on said drum beyond opposite edges of said blanket in opposite directions to the direction of winding of said blanket, and means for applying tension to said chains to hold said blanket taut as it is more or less wrapped or unwrapped about said drying portion as said frame is swung about its pivot.

7. For use in a matrix drier having a convex matrix-receiving face, a frame, a drum journaled in said frame, a member pivoted to said frame in spaced relation to said drum and which may be secured to said drier adjacent to its said face, a blanket secured at one end to said member and having its opposite end wound on said drum, and yielding means tending to rotate said drum and hold said blanket taut between said member and drum.

8. For use in a matrix drier having a convex matrix-receiving face, a frame, a drum journaled in said frame, a member pivoted to said frame in spaced relation to said drum and which may be secured to said drier adjacent to said face, a blanket secured at one end to said member and having its opposite end wound on said drum, a flexible element secured to said drum element, a pulley journaled on said frame adjacent to said member and over which said element passes and a weight supported by said element, said element being wound on said drum in the direction to cause said weight to tend to wind said blanket on said drum and to keep it taut between said drum and member.

9. For use in a matrix drier having a convex matrix-receiving face, a frame, a drum journaled in said frame, a member pivoted to said frame in spaced relation to said drum and which may be secured to said drier adjacent to said face, a blanket secured at one end to said member and having its opposite end wound on said drum, a flexible element secured to said drum element, a pulley journaled on said frame adjacent to said member and over which said element passes, a weight supported by said element, said element being wound on said drum in the opposite direction to said blanket to cause said weight to tend to wind said blanket on said drum and to keep it taut between said drum and member, and a stop to limit the rocking movement of said frame in one direction.

10. For use in a matrix drier having a convex matrix-receiving face, a frame, a drum journaled in said frame, a member pivoted to said frame in spaced relation to said drum and which may be secured to said drier adjacent to said face, a blanket secured at one end to said member and having its opposite end wound on said drum, a flexible element secured to said drum element, a pulley journaled on said frame adjacent to said member and over which said element passes, a weight supported by said element, said element being wound on said drum in the opposite direction to said blanket to cause said weight to tend to wind said blanket on said drum and to keep it taut between said drum and member, a stop to limit the rocking movement of said frame in one direction, and a pulley journaled on said frame adjacent to said stop and with which said element may contact when said frame is swung to one angular position.

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