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P. BREUER

DRYING MACHINE

Filed Jan. 6, 1923

2 Sheets-Sheet 1

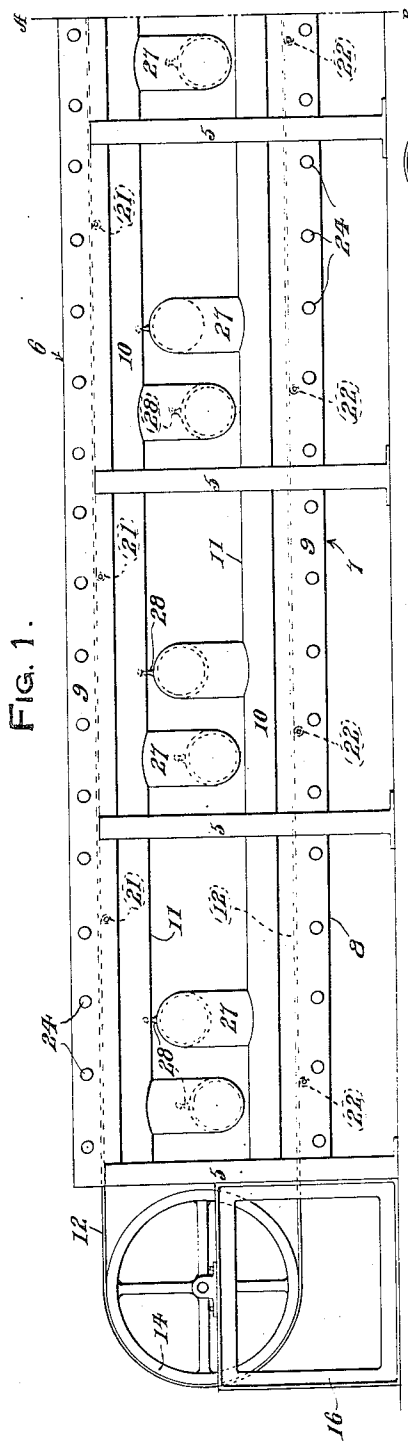
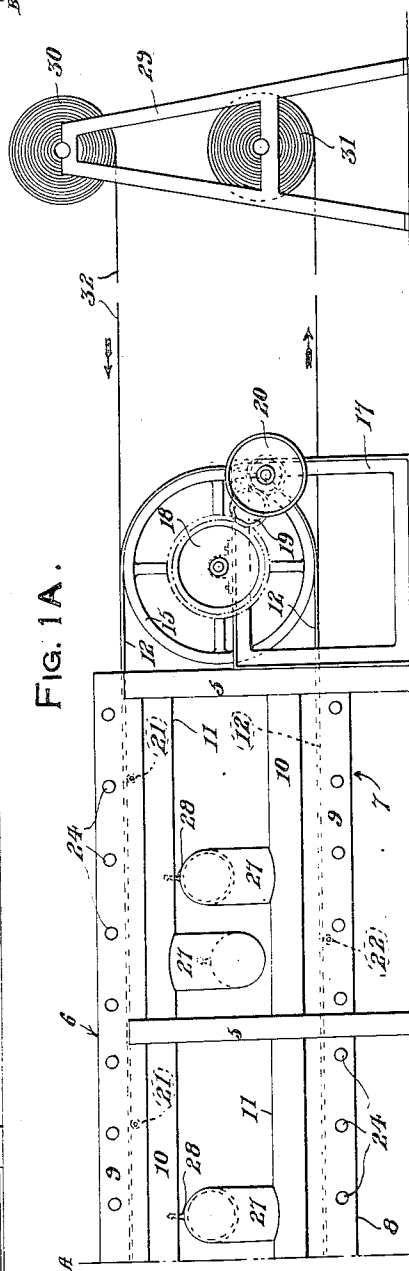


FIG. 1A.



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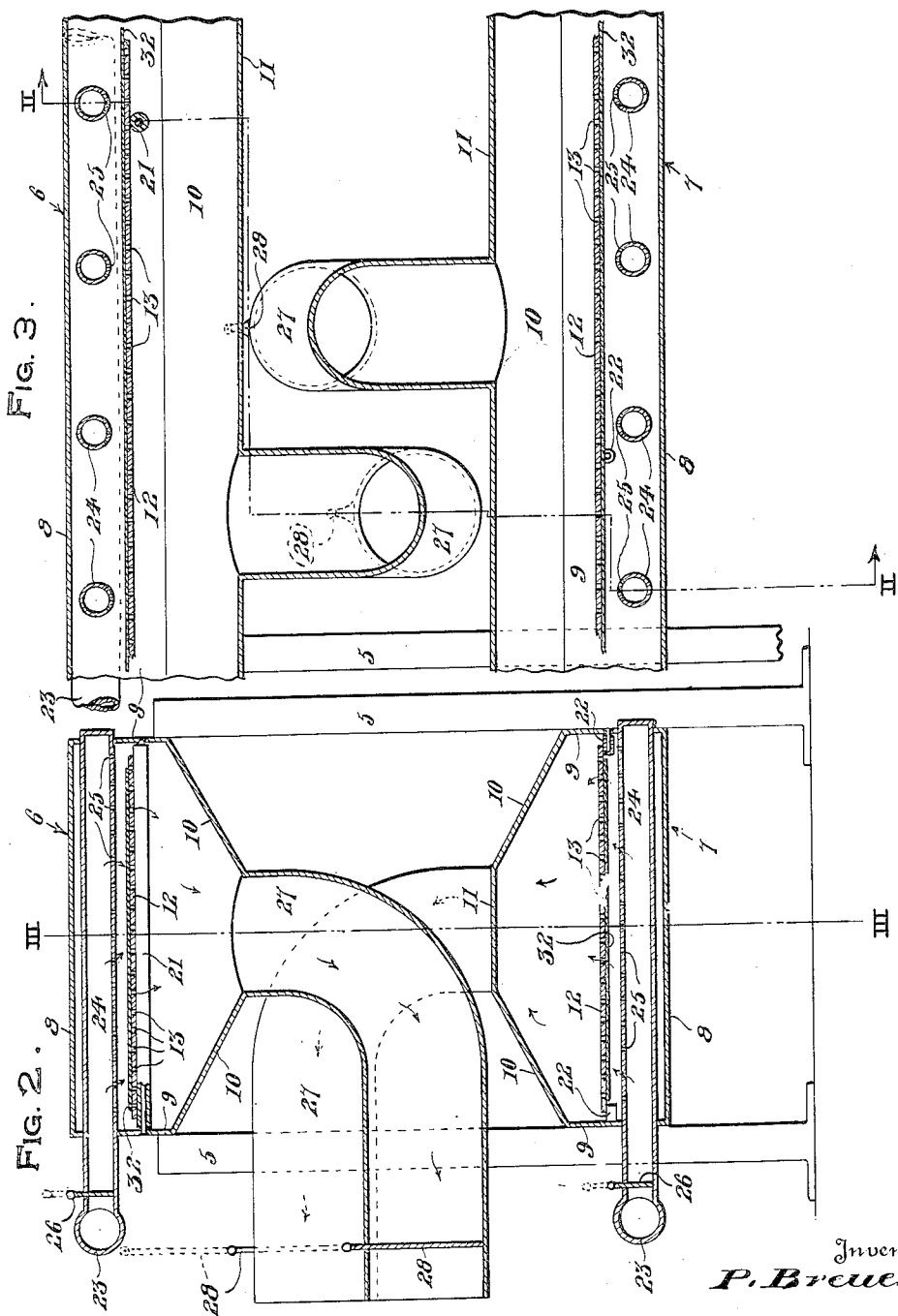
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE.

PETER BREUER, OF MILWAUKEE, WISCONSIN.

## DRYING MACHINE.

Application filed January 6, 1923. Serial No. 611,138.

*To all whom it may concern:*

Be it known that I, PETER BREUER, a citizen of the United States of America, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Drying Machines, of which the following is a specification.

This invention relates to certain new and useful improvements in drying machines and has particular reference to that type of machine especially designed for drying coated and wall paper.

The primary object of the invention resides in the provision of a drying machine wherein an endless belt passing over spaced pulleys has the spaced runs thereof passing through separate drying chambers with supply and exhaust means for a drying medium associated with the drying chamber.

A further object of the invention is to provide in a drying machine of the type above set forth, a perforated metallic endless belt, the supply means for the drying medium being positioned outwardly thereof while the exhaust means is associated with the drying chambers in a manner to insure perfect and even drying of the paper passing through the drying chambers, the drying medium and moisture being drawn through the paper and perforated metallic belt.

A further object of the invention is to provide in a drying machine of the above type a conveying means for coated or wall paper with supply and exhaust means for a drying medium associated therewith in a manner to cause the paper to travel in intimate engagement with the conveying means.

With the above general objects in view and others that will appear as the nature of the invention is better understood, the same consists of the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings, wherein like reference characters designate corresponding parts throughout the several views,

Figures 1 and 1<sup>a</sup> show side elevational views of the complete drying machine, the two figures being separated on the lines A—B, showing the spaced drying chambers, the spaced runs of the endless belt

passing through the drying chambers, the driving means for the belt and the supply and receiving rolls for the paper or other material being dried,

Figure 2 is a sectional view taken on line II—II of Fig. 3, showing the upper and lower spaced drying chambers, the spaced runs of the perforated metallic belt traveling through the drying chambers and the supply and exhaust means for the drying medium, and

Figure 3 is a vertical cross-sectional view taken on line III—III of Fig. 2, showing the branch pipes from the supply manifold for the drying medium extending transversely of the drying chambers adjacent the outer walls thereof with the exhaust means connected to the opposed walls of the spaced drying chambers.

The machine disclosed herein, being especially designed for drying coated and wall paper, the same embodies a frame structure including spaced vertical standards supporting spaced upper and lower longitudinally extending drying chambers 6 and 7 respectively.

The drying chambers 6 and 7 are shown more clearly in Figs. 2 and 3, each chamber including an outer horizontal longitudinally extending wall 8, relatively short side walls 9 with the adjacent walls of the drying chambers 6 and 7 formed of inclined side sections 10 extending the complete length of the drying chambers with a centrally disposed flat bottom wall section 11.

An endless conveying belt has the spaced runs thereof disposed in the upper and lower drying chambers 6 and 7, the belt 12 being constructed of metal and provided over the entire surface thereof with a plurality of perforations 13, the belt 12 traveling over pulleys 14 and 15 journaled in frames 16 and 17 disposed at opposite ends of the frame structure as shown in Figs. 1 and 1<sup>a</sup>. The driving means for the belt and pulleys includes a gear wheel 18 fixed to the shaft supporting the pulley 15 with which a pinion 19 meshes, the pinion being driven by the wheels 20 that communicate with a suitable source of power. A guide and support for the upper run of the endless belt 12 traveling through the drying chamber 6 includes a plurality of transversely extending rollers 21 disposed in the drying chamber 6 at a point spaced

from the outer wall 8 thereof as clearly shown in Figs. 2 and 3, the lower run of the belt traveling through the drying chamber 7 being supported at its side edges by the stub rollers 22.

Supply and exhaust means for a drying medium, such as heated air is associated with each drying chamber 6 and 7, the supply means including a longitudinally extending manifold pipe 23 positioned exteriorly of and longitudinally aligned with one side of each drying chamber, the manifold pipe 23 carrying lateral branch extensions 24 lying transversely within the drying chambers as shown in Fig. 2, the side walls of the branch pipes 24 adjacent the inner walls of the drying chambers being perforated as at 25, while a damper valve 26 is carried by each branch pipe. A series of spaced exhaust pipes 27 communicate with the interior of the drying chambers 6 and 7 through the wall sections 11 of the inclined adjacent walls of said drying chambers, the exhaust pipes 27 being curved as shown in Fig. 2 and extending laterally of the frame structure, each being provided with a damper valve 28 and communicating with exhaust manifold pipes, similar to the pipe 23.

As shown in Fig. 1<sup>a</sup>, a frame 29 supports unwinding and receiving rolls 30 and 31 respectively delivering and receiving sheet or strip material 32 to and from the drying chambers 6 and 7, the strips 32 traveling in the directions indicated by the arrows in Fig. 1<sup>a</sup> to be fed upon the upper run of the perforated metallic belt 12 as shown in Figs. 2 and 3, the strip passing over the pulley 14 and continuing in engagement with the lower ply of the belt as illustrated. A drying medium, such as heated air is delivered to each drying chamber 6 and 7 through the damper controlled branch pipes 24 for directing the drying medium onto the strip 32. The suction pipes 27 have their active ends disposed adjacent the opposite sides of the perforated metallic belt 12 that supports the strip 32, creating sufficient suction to draw the heated air and moisture through the strip 32 and apertured belt for exhausting the same and insuring an even and complete drying of the strip. It is to be understood that a suitable coating apparatus for the paper strip 32 may be interposed between the frame supports 17 and the roll supports 29 for applying adhesive or other moist substance to the upper run of the strip 32. The apparatus is capable of being constructed at a considerably reduced cost compared with previous devices of a similar nature, and is so designed as to require less space and still insure a more perfect drying of material delivered there-through. The endless perforated metallic belt, and the spaced drying chambers pro-

vide a double or duplicate drying for the strip 32, the association of the exhaust devices with the drying chambers maintaining the strip 32 in intimate engagement with the endless belt over the entire travel thereof through the drying chambers.

While there is herein shown and described the preferred embodiment of the present invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope thereof as claimed.

What is claimed as new is:—

1. In a drying machine of the type described, a frame structure, upper and lower drying chambers supported on the frame structure, an endless belt having the upper and lower runs passing through the drying chambers and supply and exhaust means for a drying medium associated with the drying chambers.

2. In a drying machine of the type described, a frame structure, separate drying chambers supported on the frame structure, an endless belt having the spaced runs thereof passing through the separate drying chambers and supply and exhaust means for a drying medium associated with the drying chambers.

3. In a drying machine of the type described, a frame structure, separate drying chambers supported on the frame structure, an endless metallic perforated belt having the spaced runs thereof passing through the separate drying chambers and supply and exhaust means for a drying medium associated with the drying chambers.

4. In a drying machine of the type described, a frame structure, separate drying chambers supported on the frame structure, conveying means for a strip of material to be dried associated with said chambers, and supply and exhaust means for a drying medium connected to the drying chambers, the conveying means being constructed to permit the strip of material to intimately contact the same which is caused by the drying medium being drawn therethrough.

5. In a drying machine of the type described, a frame structure, upper and lower drying chambers supported on the frame structure, an endless belt having the upper and lower runs passing through the drying chambers, supply and exhaust means for a drying medium associated with the drying chambers and supporting guide rollers for the belt runs disposed in each drying chamber.

6. In a drying machine of the type described, a frame structure, separate drying chambers supported on the frame structure, an endless belt having the spaced runs thereof passing through the separate drying chambers, supply and exhaust means for a drying medium associated with the

drying chambers, and supporting guide rollers for the belt runs disposed in each drying chamber.

7. In a drying machine of the type described, a frame structure, separate drying chambers supported on the frame structure, an endless metallic perforated belt having the spaced runs thereof passing through the separate drying chambers, supply and exhaust means for a drying medium associated with the drying chambers, and supporting guide rollers for the belt runs disposed in each drying chamber.

8. In a drying machine of the type described, a frame structure, upper and lower drying chambers supported on the frame structure, an endless belt having the upper and lower runs passing through the drying chambers, supply and exhaust means for a drying medium associated with the drying chambers, and supporting guide rollers for the belt runs disposed in each drying chamber, the adjacent walls of each drying chamber being of substantially frusto-conical formation and the exhaust means being directly connected to the bottom walls of the chambers.

9. In a drying machine of the type described, a frame structure, separate drying chambers supported on the frame structure, an endless belt having the spaced runs thereof passing through the separate drying chambers, supply and exhaust means for a drying medium associated with the drying chambers, and supporting guide rollers for the belt runs disposed in each drying chamber, the adjacent walls of each drying chamber being of substantially frusto-conical formation and the exhaust means being directly connected to the bottom walls of the chambers.

10. In a drying machine of the type described, a frame structure, separate drying chambers supported on the frame structure, an endless metallic perforated belt having the spaced runs thereof passing through

the separate drying chambers, supply and exhaust means for a drying medium associated with the drying chambers, and supporting guide rollers for the belt runs disposed in each drying chamber, the adjacent walls of each drying chamber being of substantially frusto-conical formation and the exhaust means being directly connected to the bottom walls of the chambers.

11. In a drying machine of the type described, a frame structure, upper and lower drying chambers supported on the frame structure, a pulley wheel journaled at each end of the frame, an endless metallic perforated belt passing over said pulley wheels with the spaced runs thereof passing through the drying chambers, driving means for the belt, the bottom walls of each chamber being inclined toward the center thereof, supply means for a drying medium disposed outwardly of the belt runs and in the chambers, and exhaust means associated with the central portions of the inclined bottom walls.

12. In a drying machine of the type described, a frame structure, upper and lower drying chambers supported on the frame structure, a pulley wheel journaled at each end of the frame, an endless metallic perforated belt passing over said pulley wheels with the spaced runs thereof passing through the drying chambers, driving means for the belt, the bottom walls of each chamber being inclined toward the center thereof, supply means for a drying medium disposed outwardly of the belt runs and in the chambers, exhaust means associated with the central portions of the inclined bottom walls, the supply means including externally positioned manifold pipes and branch pipes extending therefrom transversely within the drying chambers.

In testimony whereof I affix my signature.

P. BREUER.