No. 873,723. PATENTED DEC. 17, 1907.

S. A. COHEN.

DRYING MACHINE.

APPLICATION FILED APR. 18, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

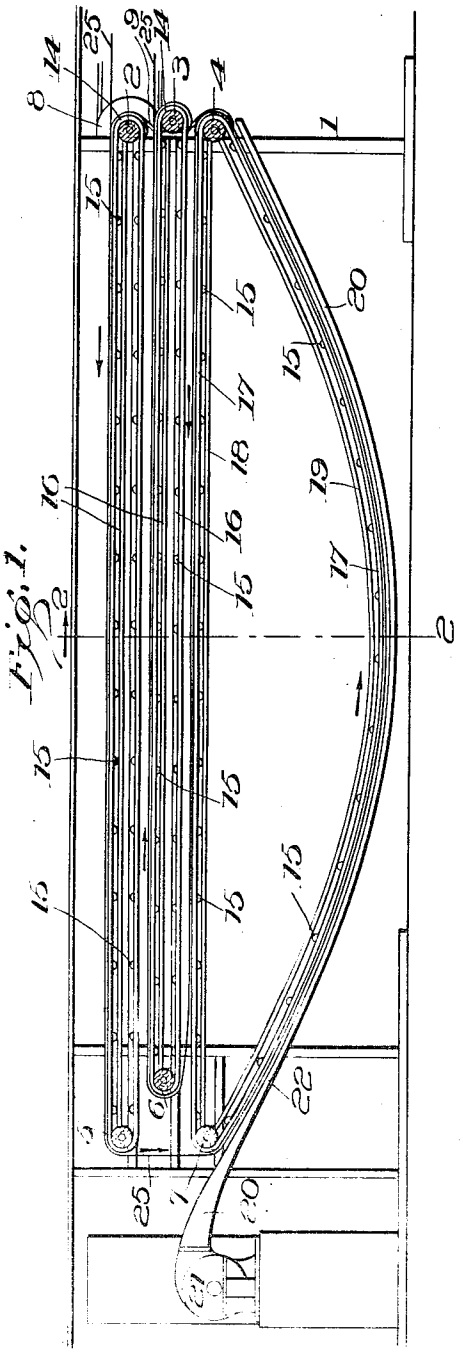
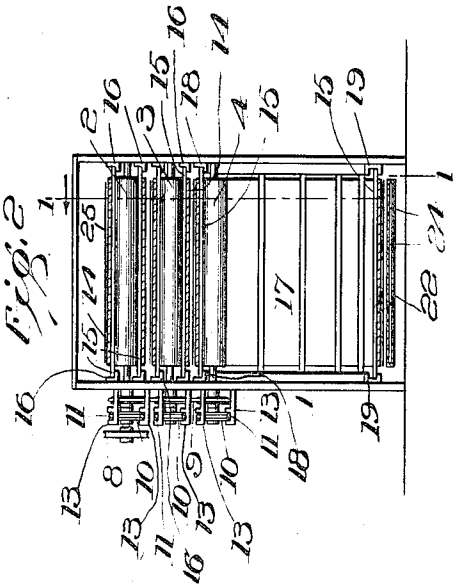


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

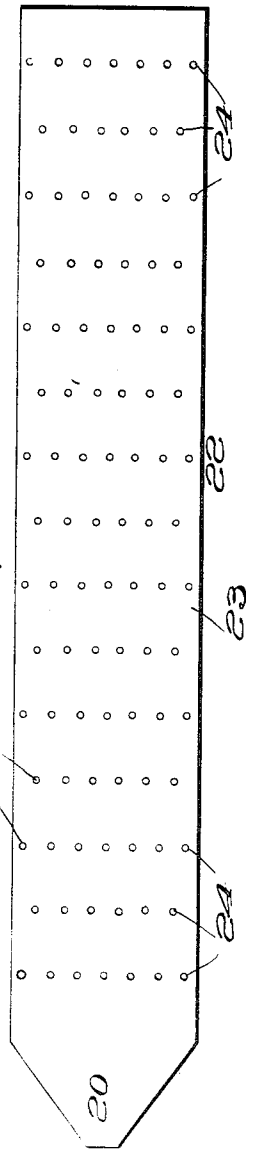
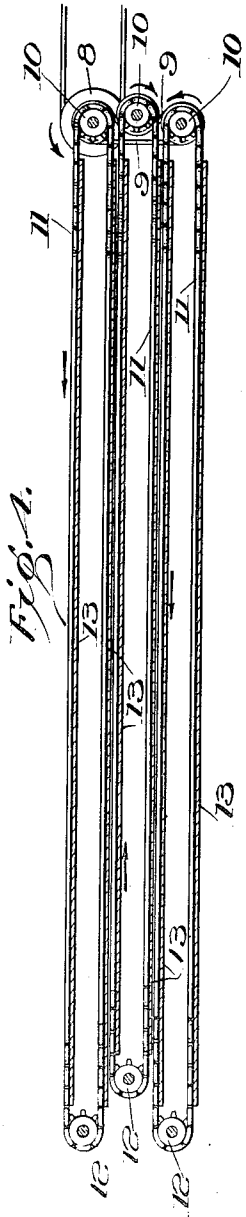


Fig. 4.



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UNITED STATES PATENT OFFICE.

STANLEY A. COHEN, OF NEW YORK, N. Y.

DRYING-MACHINE.

No. 873,723. Specification of Letters Patent. Patented Dec. 17, 1907.

Application filed April 18, 1906. Serial No. 312,296.

To all whom it may concern:

Be it known that I, STANLEY A. COHEN, a citizen of the United States, residing in the borough of Manhattan, New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Drying-Machines, of which the following is a specification.

My invention consists of improvements in machines for drying paper or fabric in the web, and is especially adapted to drying such material when coated by ink or other coloring matter, paste, enamel or gum.

The object of my invention is to provide a compact device, simple, easily constructed and requiring little skill to operate.

It is especially adapted to drying material in the web quickly when it or its coating or sizing is quite damp or moist as it comes directly from the machine where the coating is applied or the moisture acquired. Its capacity is limited only by the amount of delivery of material to it. The material passing through my machine is never under tension, so that it is adapted to dry the most fragile or brittle stock, as well as that of great tensile strength. Its construction insures absolute uniformity of drying. Injury to the coating or printing upon the paper or fabric while in the process of drying is absolutely avoided. As the material receives a constant and equal pressure at every point of its exposed surface during the process of drying, it will not curl or stretch unevenly, as is the case in machines where festoons or other devices are employed, which prevent perfect circulation of air by reason of the close proximity of one portion of the web to another.

Figure 1 of the drawings is a vertical sectional view of my machine on the line 1—1 of Fig. 2. Fig. 2 is a vertical section on the line 2—2 of Fig. 1, showing the driving means. Fig. 3 is a plan view of the perforated plate forming the top of the hot-air box beneath the machine. Fig. 4 is a detail sectional view of the driving mechanism.

Referring to the drawings, 1 is the frame of the machine having suitable bearings therein for the shafts of the six rollers, 2, 3, 4, 5, 6 and 7. The roller 2 is rotated by means of the pulley 8, fixed to its shaft. Rollers 3 and 4 are rotated in the directions indicated by the arrows in unison with roller 2 by means of the endless belt 9 (Figs. 2 and 4). Sprocket wheels 10 on the shafts of the rollers 2, 3 and 4 engage endless chains 11, which extend lengthwise of the machine, engaging sprocket wheels 12 (Fig. 4) upon the shafts of rollers 5, 6 and 7. Supports 13 for the chains 11 are secured lengthwise to the frame 1 (Fig. 2) to prevent the chains from sagging. Between rollers 2 and 5 and 3 and 6 are stretched endless blankets 14 equipped on the inner side with thin transverse stiffening strips 15, which extend beyond the edges of the blanket (Fig. 2) and are upheld and guided upon the horizontal guides 16, which extend lengthwise of the machine. The lower blanket 17, which extends between rollers 4 and 7, is likewise provided with stiffening transverse strips 15, which are supported and guided along their upper path upon the horizontal strip 18, while a curved grooved strip 19 is provided below to guide the blanket 17 along its lower curved path indicated in Fig. 1. The pipe 20 leads from the blower 21 to the narrow, curved hot-air box 22, which extends beneath and conforms to the curved path of the lower blanket 17. The top 23 of the hot-air box 22 has numerous perforations or apertures 24 along its surface, as best indicated in Fig. 3. The web of paper or fabric is indicated by the number 25.

The operation of the machine is as follows: The rotation of the pulley 8 in the direction indicated by the arrow in Fig. 4, serves to drive the six rollers and three endless blankets in the direction indicated by the arrows. The web of paper or fabric to be dried comes upon the machine just above the roller 2 and is carried by the blanket 14, upon which it rests until it reaches roller 5, when it is led downward to the blanket 17, which moves in a curved path just above hot-air box 22. At the end of the curved path, the web is carried around roller 4 and upon blanket 17 until roller 6 is reached, when the direction of the web is reversed, and it is carried on the intermediate blanket for delivery from the machine directly under the point where it entered. During the first portion of the course or path of the web to be dried, it is not subjected to excessive heat or blasts of hot air, so that the material has an opportunity to become slightly dried or set, so that when subjected to the blasts of hot air escaping from apertures 24 in the hot-air box 22, the coating will not be disturbed or roughened by the force of the blast. The most effective portion of the drying takes

place during the progress of the web past the hot-air box 22. The backward and forward course of the web to, around and past the roller 6 thereafter gives the material an opportunity to cool before being rolled upon its delivery from the machine. While the web is being subjected to the hot-air blast, it is moving along a path curved to conform to its natural curve if suspended from the rollers 4 and 7, so that the web itself and the coating thereon are not subjected to any strain or pull except the slight frictional feeding by the blanket, against which the web is forced by the air pressure to effect contact with the blanket.

The hot air escapes from the sides of the machine between the web and the hot-air box 22 and rises to heat slightly the upper part of the machine, giving at the same time a free circulation of air to carry away the moisture. The transverse stiffening and guiding strips 15, which are secured across the inner surface of the blankets, are very thin (their size being exaggerated in the drawings for the sake of clearness), so that when they pass the rollers, the web will be but slightly moved from its smooth, regular path.

The number of blankets and hot-air boxes may be increased to suit the requirements of various materials and varying amounts of moisture to be evaporated.

What I claim as new and desire to secure by Letters Patent is:

1. In a drying machine, an endless blanket for receiving and carrying the web, a second endless blanket adapted to be driven in a curved path conforming substantially to the natural curve of the web when supported at each end of said path, means for holding the web by air currents against the second blanket and means for driving both blankets.

2. In a drying machine, an endless blanket, guides adapted to lead the blanket in a curved path conforming substantially to the natural curve of the web if supported only at each end of said path, means to drive the blanket and means to hold the web by air pressure against the lower surface of the driven blanket so that the web will be carried along by the blanket while being dried by the currents of air.

3. In a drying machine, an endless blanket to carry the web from the device where it has been moistened or coated, a second endless blanket upon which the web is held by currents of air against gravity, and means to drive both blankets.

4. In a drying machine, a plurality of endless blankets adapted to carry and feed the web during drying, stiffening rods transverse of said blankets, guides to support said rods and blankets, and positive means for driving said blankets in unison at the same speed by engagement at both ends of each blanket.

Signed at New York city in the county of New York and State of New York this 10th day of April A. D. 1906.

STANLEY A. COHEN.

Witnesses:
ADOLPH AXEWROTH,
ROBERT ZEHL.