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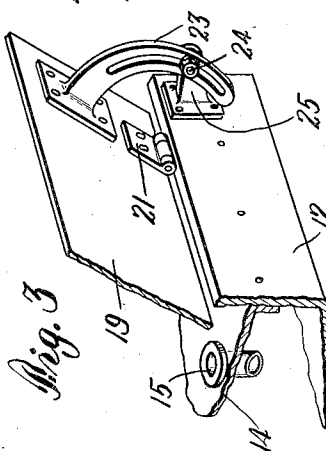
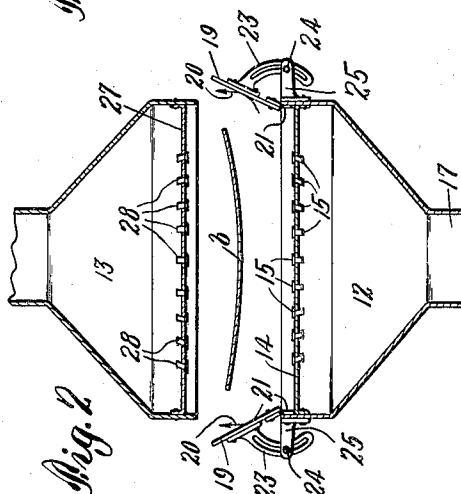
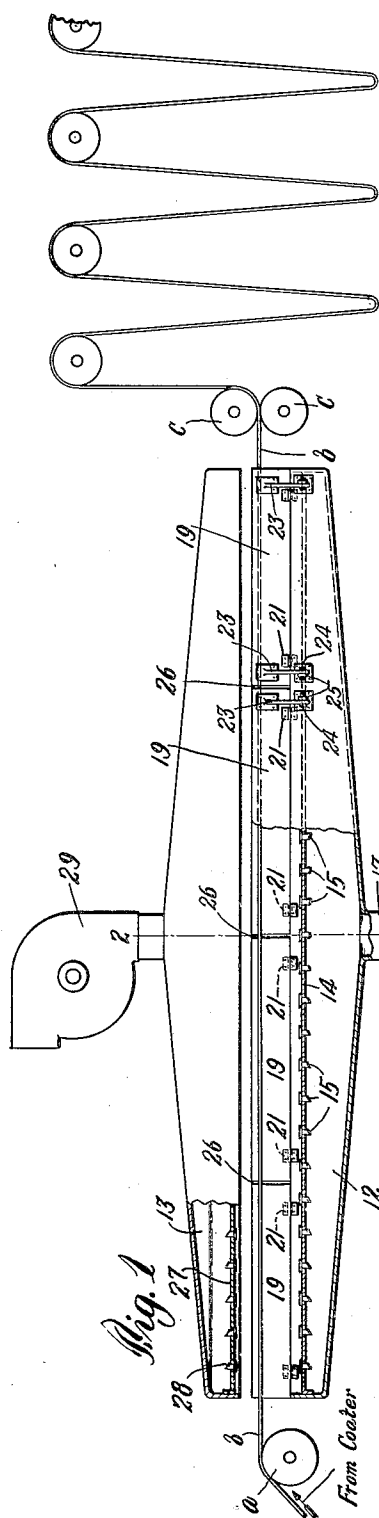
C. J. MERRILL

1,737,015

MACHINE FOR DRYING COATED WEBS

Filed April 30, 1928

2 Sheets-Sheet 1



Inventor:
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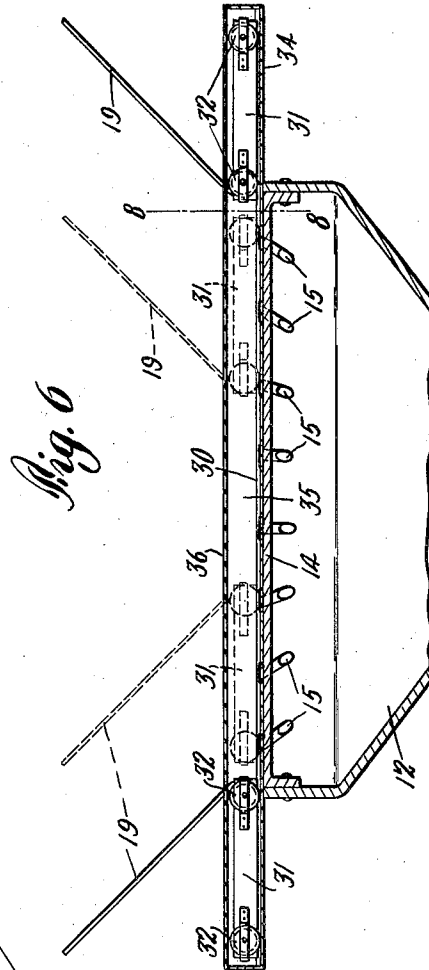
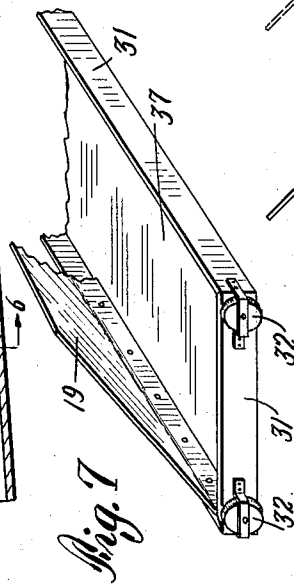
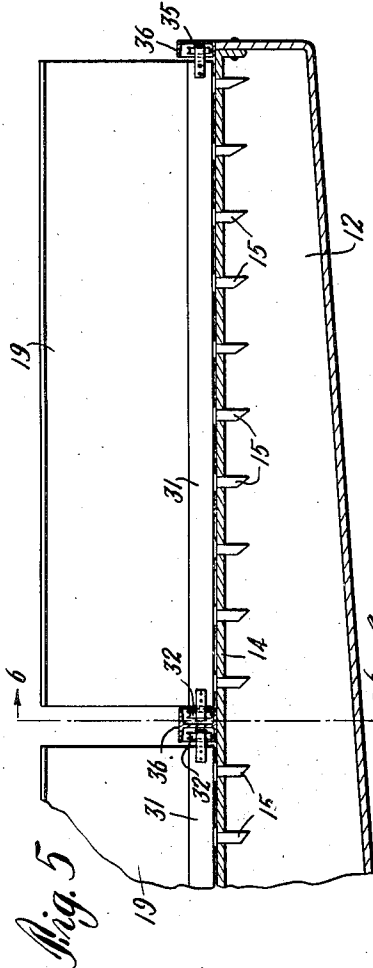
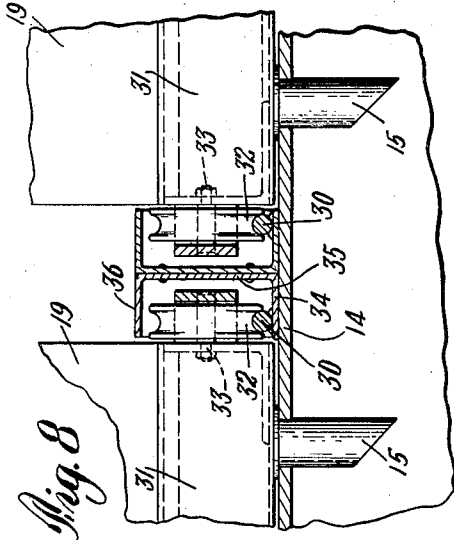
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MACHINE FOR DRYING COATED WEBS

Filed April 30, 1928

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

CARLE J. MERRILL, OF PORTLAND, MAINE

MACHINE FOR DRYING COATED WEBS

Application filed April 30, 1928. Serial No. 273,827.

This invention relates to apparatus for drying a coated web of paper, or other flexible material, while it is being progressively moved horizontally, the drying apparatus being located between suitable guiding and feeding devices organized to horizontally support and move a coated portion of the web, the drying apparatus being adapted to cause the support of said portion wholly by heated air which dries it, so that the coating, while being dried, cannot be marred by contact with any portion or portions of the apparatus.

The chief object of the invention is to provide certain improvements in the drying apparatus whereby the air which dries the under side of the freshly coated horizontal portion of the web, is caused to support said portion in such manner as to prevent the edges, as well as the longitudinal center of said portion from sagging, and contacting with a portion or portions of the apparatus liable to mar the coating.

Other objects will hereinafter appear.

Of the accompanying drawings forming a part of this specification,—

Figure 1 shows partly in section and partly in side elevation, a drying apparatus embodying the invention, and web-guiding and feeding devices at opposite ends of the apparatus.

Figure 2 is a vertical section on the plane indicated by the line 2—2 of Figure 1.

Figure 3 is a fragmentary perspective view, showing a portion of the lower air chamber, and a portion of one of the air-deflecting curbs hereinafter described.

Figure 4 is a fragmentary sectional view, showing a portion of the lower air chamber.

Figure 5 is a fragmentary sectional view, showing a portion of the lower air chamber, portions of two of the deflecting curbs, and portions of carriers supporting the curbs and movable in tracks on the chamber.

Figure 6 is a section on line 6—6 of Figure 5.

Figure 7 is a fragmentary perspective view, showing a portion of one of the carriers and a portion of a curb fixed thereto.

Figure 8 is a fragmentary section on line 8—8 of Figure 6.

The same reference characters indicate the same parts in all of the figures.

A guiding device *a* is shown conventionally in Figure 1, said device being adapted to support one end of a horizontal portion *b* of a flexible web. At *c* is shown conventionally a guiding device adapted to cooperate with the device *a* in horizontally guiding the web portion *b*, the means *c* being spaced from the means *a* a sufficient distance to permit the drying of the web coating by the apparatus next described, before the coating reaches the means *c*. A distance of about one hundred and thirty feet is usually sufficient, but may be greater or less.

My improved drying apparatus is oblong and formed to be interposed and horizontally supported between the means *a* and *c*, and includes a lower oblong air chamber 12, and an upper oblong air chamber 13, each of which may be approximately one hundred and twenty-five feet long, although the length may be greater or less.

The chamber 12 has an upwardly facing substantially horizontal top 14, spaced below the path in which the web portion *b* is guided, and provided with a group of uniformly spaced air outlets 15, adapted to direct jets of air upwardly against the under side of the web. The outlets 15 are preferably short tubes or nozzles, fixed in orifices in the top 14, although they may be otherwise formed.

The nozzles at the longitudinal center of the top 14 may be vertical, and the others variously inclined, as shown by Figure 2, so that air jets may be directed vertically against the longitudinal center of the web and at various inclinations toward opposite edges thereof, as indicated by arrows in Figure 2. The object of this arrangement of the nozzles is to correct a tendency of the web *b* to move edgewise from its predetermined path. For example, if the web moves to the left from the predetermined position shown by Figure 2, the air pressure under the right hand edge portion is so decreased that the web moves automatically edgewise in the opposite direction, until it returns to its normal position.

Heated air is forced into the chamber 12 by means such as a blower, the casing of which

is designated by 16, the outlet 17 of the blower communicating with the midlength portion of the chamber. The lower ends of the nozzles 15 preferably project below the top 14, and are beveled, as indicated by Figures 1 and 4, the beveled ends of one side of the midlength portion being at an opposite inclination from those at the opposite side, so that said beveled ends are adapted to catch air moving in opposite directions from the outlet 17.

Extending lengthwise of the chamber 12, at opposite edges of the group of air outlets 15, are air-deflecting curbs 19, projecting upwardly from the top 14 and spaced from the path of the web portion *b* as shown by Figure 2. The curbs are arranged to upwardly deflect air which would escape or spill horizontally outward under the edges of the web, if the curbs were not provided, the deflection of the air by the curbs being indicated by the arrows 20 in Figure 2. The air thus deflected tends to raise the longitudinal edges of the web, and thus prevent downward sagging of said edges, the transverse curvature shown by Figure 2, being imparted to the web by the upwardly deflected air. It is important that the curbs be spaced outward from the edges of the web sufficiently to permit the upward and outward escape of air between the opposite longitudinal edges of the web and the curbs and cause the escaping air to raise said edges. To prevent variations from the desired spacing, by variations in the width of the web, I provide means for laterally adjusting the curbs. In the embodiment shown by Figures 1, 2, and 3, I connect the curbs with the chamber top 14 by hinges 21, which permit adjustment of the curbs, so that their sides may stand vertically, or at various inclinations relative to the top 14. In case the width of the web is less than that shown by Figure 2, the curbs should be adjusted to or toward a vertical position. If the web is wider, the outward inclination of the curbs should be increased. I provide means for positively securing the hinged curbs in any adjusted position, said means being embodied, in this instance, in curved slotted arms 23, fixed to the curbs, and bolts 24 engaged with the slots of said arms and with ears 25, fixed to the chamber 12.

The curbs 19 are made in sections arranged end to end, the division between two adjacent sections being indicated at 26 in Figure 1. If each curb were continuous, it would be unwieldly and difficult of adjustment, considering the length of the chamber, the curbs being of the same length.

The upper air chamber 13, is provided with a substantially horizontal downwardly facing bottom 27, having air outlets 28, arranged to deliver jets of air against the upper surface of the web portion *b*. Said outlets may be nozzles having the same form and arrangement as the nozzles 15 of the chamber 12. Heated

air may be forced into the upper chamber by a blower, the casing 29 of which is shown by Figure 1. The curbs are spaced from the bottom of the upper air chamber to permit the escape of air acting on the upper side of the web.

The curbs 19 may be bodily movable laterally toward and from the longitudinal edges of the web *b* so that they may have a wider range or greater amplitude of lateral adjustability than is the case when the curbs are hinged to the chamber.

Figures 5, 6, 7 and 8 show means for supporting and permitting bodily lateral movements of the curbs without varying their inclination.

To the top 14 of the air chamber 12 are fixed transverse tracks 30, the ends of which preferably project outward from the longitudinal edges of the chamber, as shown by Figure 6. Each curb 19 is fixed at its lower edge to a carrier which includes a rectangular oblong frame or body 31, and wheels 32 journaled on stub axles 33, fixed to the ends of the frame, there being preferably two wheels at each end of the carrier. The tracks are preferably cylindrical rods or bars, and the wheels are preferably grooved to fit the tracks, as shown by Figure 8. The arrangement is such that the carriers and curbs may be moved from the full line to the dotted line positions shown by Figure 6.

The tracks may be fixed to channeled guards, each including a base flange 34, fixed to the top 14, a vertical web 35, and a top flange 36. The adjacent ends of the sections constituting the curbs, are spaced apart, as indicated by Figures 5 and 8, there being two tracks 30 and two channeled guards in each space, the webs 35 of the two guards being riveted together back to back, as best shown by Figure 8. Each end portion of the chamber is provided with one track and guard, as shown at the right in Figure 5.

The frame or body 31 of each carrier may be provided with a flat sheet metal bottom plate or filler 37 (Figure 7) which is in such close proximity to the upper surface of the chamber top 14 that it closes the air outlets 15 under it, so that there is no considerable loss of air through outlets 15 located at the outer sides of the curbs.

I claim:

1. A coated paper drying machine, formed to be interposed between spaced apart web-guiding devices adapted to guide a coated portion of a web in a horizontal path, said machine comprising an oblong air chamber having a substantially horizontal upwardly facing top provided with a group of air outlets, adapted to discharge jets of heated air upwardly, means for forcing air under pressure into the chamber, and air-deflecting curbs extending lengthwise of the chamber at opposite edges of the group of outlets, pro-

jecting upwardly from the top of the chamber and spaced outward from the opposite longitudinal edges of the horizontally guided web portion to permit the upward and outward escape of air across said edges, and cause the escaping air to raise said edges, the arrangement being such that the web is supported out of contact with the top and curbs by air delivered by the outlets and upwardly deflected by the curbs.

2. A coated paper drying machine as specified by claim 1, comprising also means for movably supporting the deflecting curbs on the chamber to adapt the deflectors to co-operate with webs of different widths.

3. A coated paper drying machine as specified by claim 1, comprising also transverse tracks on the chamber, and carriers supporting the curbs and movable on the tracks.

4. A coated paper drying machine as specified by claim 1, comprising also transverse tracks on the chamber, and carriers supporting the curbs and movable on the tracks, said carriers having flat bottom plates adapted to close air outlets under the carriers.

5. A coated paper drying machine, as specified by claim 1, comprising also transverse tracks on the chamber, carriers supporting the curbs and including wheels adapted to run on the tracks, and guards fixed to the chamber and overhanging the tracks and wheels.

6. A coated paper drying machine, formed to be interposed between spaced apart web-guiding devices, adapted to guide a coated portion of a web in a horizontal path, said machine comprising an oblong lower air chamber having a substantially horizontal upwardly facing top, provided with a group of air outlets adapted to discharge jets of air upwardly, an upper air chamber above, and spaced from, the lower chamber, and having a substantially horizontal downwardly facing bottom, provided with a group of air outlets adapted to discharge jets of air downwardly, means for forcing air under pressure into said chambers, and air-deflecting curbs extending lengthwise of the lower chamber at opposite edges of the group of air outlets in the top thereof, projecting upwardly from said top and spaced from the opposite edges of the guided web and from the bottom of the upper air chamber, the arrangement being such that the web is supported out of contact with said top and curbs, by air delivered by the outlets of the lower chamber and by air upwardly deflected by the curbs, the upper sides of the supported web being acted on delivered by the outlets of the upper chamber, the curbs permitting the escape of air acting on the upper side of the web.

In testimony whereof I have affixed my signature.

CARLE J. MERRILL.

CERTIFICATE OF CORRECTION.

Patent No. 1,737,015.

Granted November 26, 1929, to

CARLE J. MERRILL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 59, claim 6, after the word "on" insert the words "by air"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 31st day of December, A. D. 1929.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)