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METHOD AND DEVICE FOR CONTROLLING THE HEAT SUPPLY IN CELLULOSE DRIERS

Filed March 29, 1940

Fig. 1.

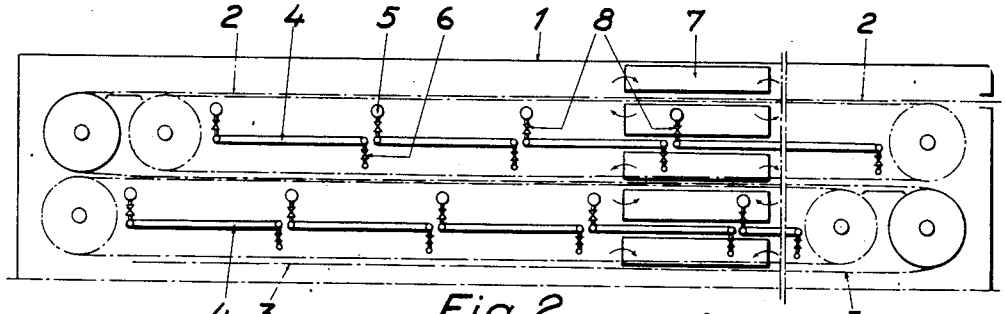


Fig. 2.

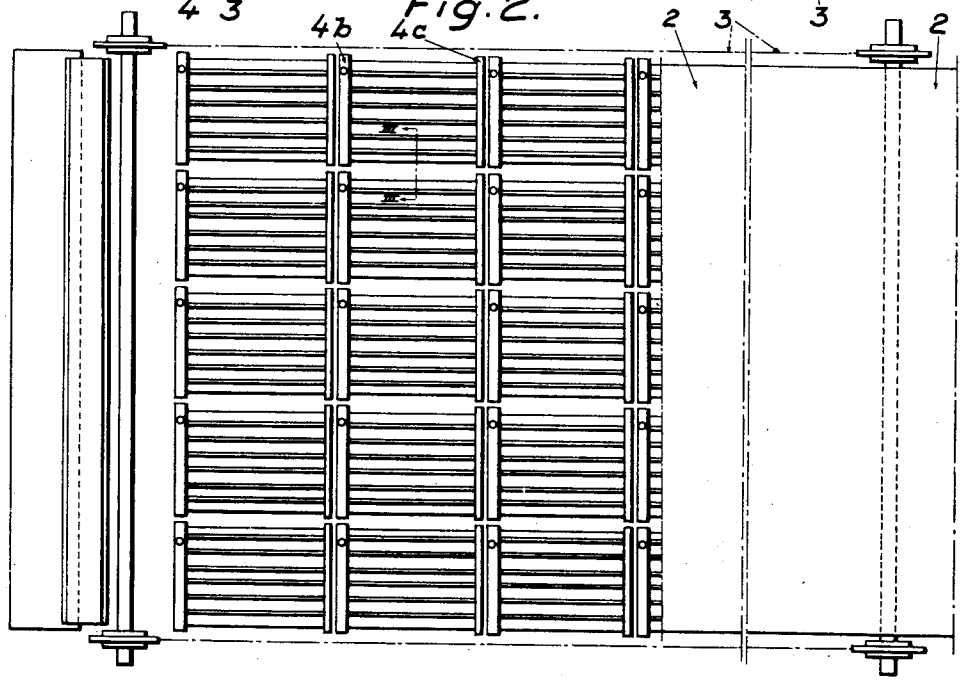
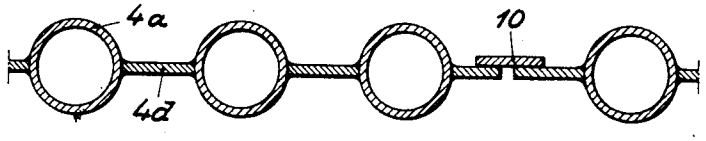


Fig. 3.



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METHOD AND DEVICE FOR CONTROLLING THE HEAT SUPPLY IN CELLULOSE DRIERS

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2 Claims. (Cl. 34—41)

In drying machines for cellulose (and like material), in which the width of the web is usually very great, often 4 meters and more, it will easily happen that the dried pulp has an uneven lateral distribution of the moisture contents. This uneven distribution of the moisture may, for instance, be caused by uneven pulp concentration in the vat or screen of the wet end or by unevennesses of the wet press rolls. Said unevenness of the moisture distribution may also be caused by an uneven wearing out of the several press felts. If the evaporation capacity (heat emission capacity) of the drying machine is constant in the lateral direction, the web, consequently, will also leave the drier with laterally uneven moisture contents. This uneven distribution of moisture above all involves the drawbacks that various portions of the web require treatments of various lengths when refining the cellulose to, for instance, paper or artificial silk, and makes it difficult to obtain an even product.

The present invention relates to a method and device for overcoming these drawbacks. The invention is substantially characterized in that the heating surface of the drier is divided both longitudinally and laterally into a number of sections, independent of one another, each of which sections is adapted to be cut off from the heat source, whereby the size of the heating surface can be controlled both longitudinally and laterally. Thus, it is possible to distribute the quantity of heat supplied to the web in such a manner that a final product with laterally even or almost even moisture contents is obtained.

The invention is illustrated on the accompanying drawing, which diagrammatically shows one embodiment of the same, and in which

Figure 1 is a vertical longitudinal section and Figure 2 a plan view.

Figure 3 is a section taken on the line III—III of Figure 2.

In Figure 1 reference numeral 1 indicates a closed drier casing, through which a web 2 is moved in a number of horizontal zig-zagged windings over a series of conveyors 3. These conveyors, for instance, may consist of endless chains with tubes extending between them and carrying the web or of longitudinally extending parallel ropes carried by supporting rollers. Between the conveyors there is provided a heating surface 4, heat being thus supplied through radiation and convection to both sides of the web. The heating surface comprises a great many heating elements or sections separated from each other but united by inlet and outlet pipes 5 and 6 for the heating medium in such a manner that each element can be controlled individually at least in some part of the drier. Moreover, the heating surface is provided relatively to the longitudinal sides of the drier casing so as to form channels for the drying air, the speed of the air along the heating surface and the web being thereby kept high all over the drier casing, which ensures an effective use of the heating surface. In the longitudinal side walls of the drier casing there are provided openings 7, through which the air necessary for the drying is circulated through the drier casing. Reference numeral 8 indicates control and cut-off valves, which are adjusted by means of members located outside the drier in order to put the corresponding sections into and out of function.

Figure 2 is a plan view of the heating surface having five individually adjustable heating elements located side by side. According to the lateral distribution of the moisture a corresponding number of heating elements are put into function, the most moist portion of the web thus receiving the greatest heat supply and the drier portions a smaller heat supply. The lateral differences in moisture contents of the web are hereby equalized, and a web with even lateral distribution of moisture is obtained as a final product.

Each heating element consists of a number of pipes 4*a* (Figure 3), at one end united by means of a distribution pipe 4*b* and at the other end united by means of a collecting pipe 4*c*. To the last mentioned pipes the inlet and outlet pipes 5, 6, are connected. The pipes 4*a* of each element are united by means of plates 4*d* (Figure 3). The expansion slot between two elements is covered by, for instance, a plate 10.

The invention is not limited to the illustrated embodiment with horizontal path of travel of the web. It may as well be applied to driers with a vertical path of travel of the web. Water or steam may be used as heating medium. In certain cases electrical heating is also advantageous.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A method of drying a continuous web comprising passing it in zig-zag fashion back and forth through a drying chamber, applying heat to both sides of said web between adjacent stretches of said web, and independently varying the quantity of heat supplied to small increments of the web longitudinally and transversely of

the web to effect drying thereof to a uniform moisture content.

2. A web drier comprising a closed casing, means for conveying a web in zig-zag fashion in a plurality of stretches through said casing, a plurality of heating elements positioned between adjacent stretches of the web, said heating elements being positioned in longitudinal and transverse rows, and means for independently controlling the heating effect of each of said elements to produce a uniform moisture content in the web.

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