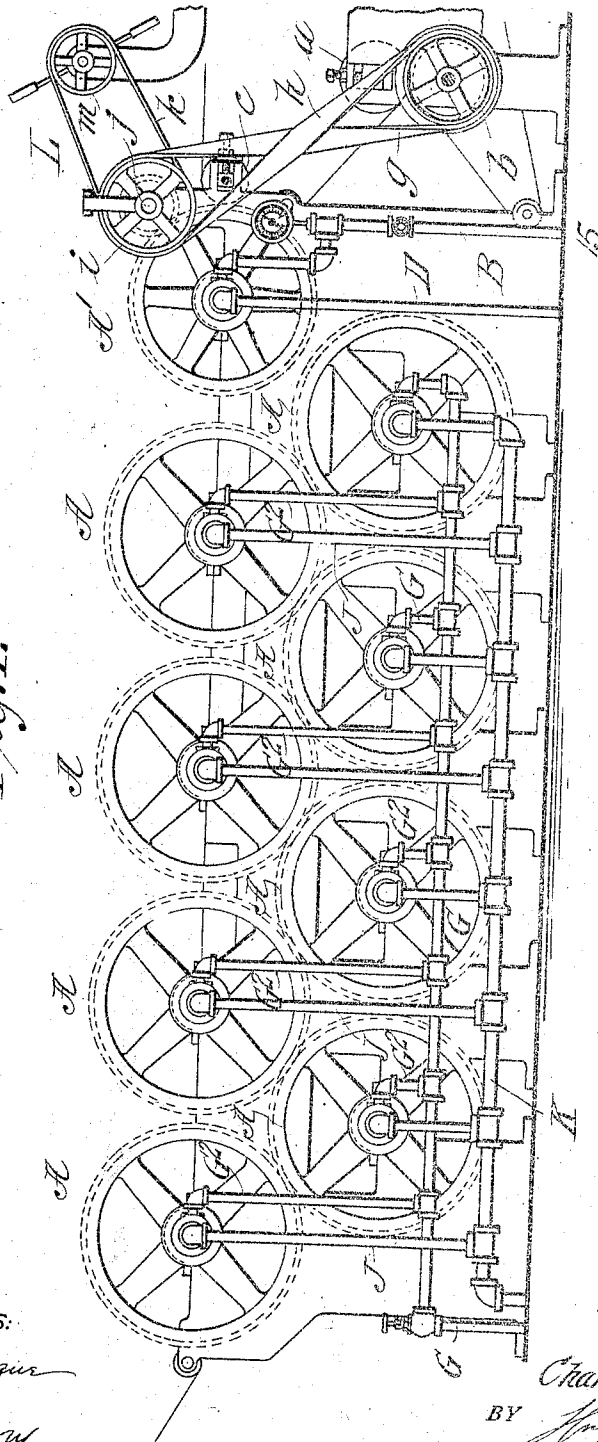


Fig. 1.



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WEB FEEDING AND DRYING APPARATUS FOR PAPER MACHINES.

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1,022,379.

Patented Apr. 2, 1912.

2 SHEETS—SHEET 2.

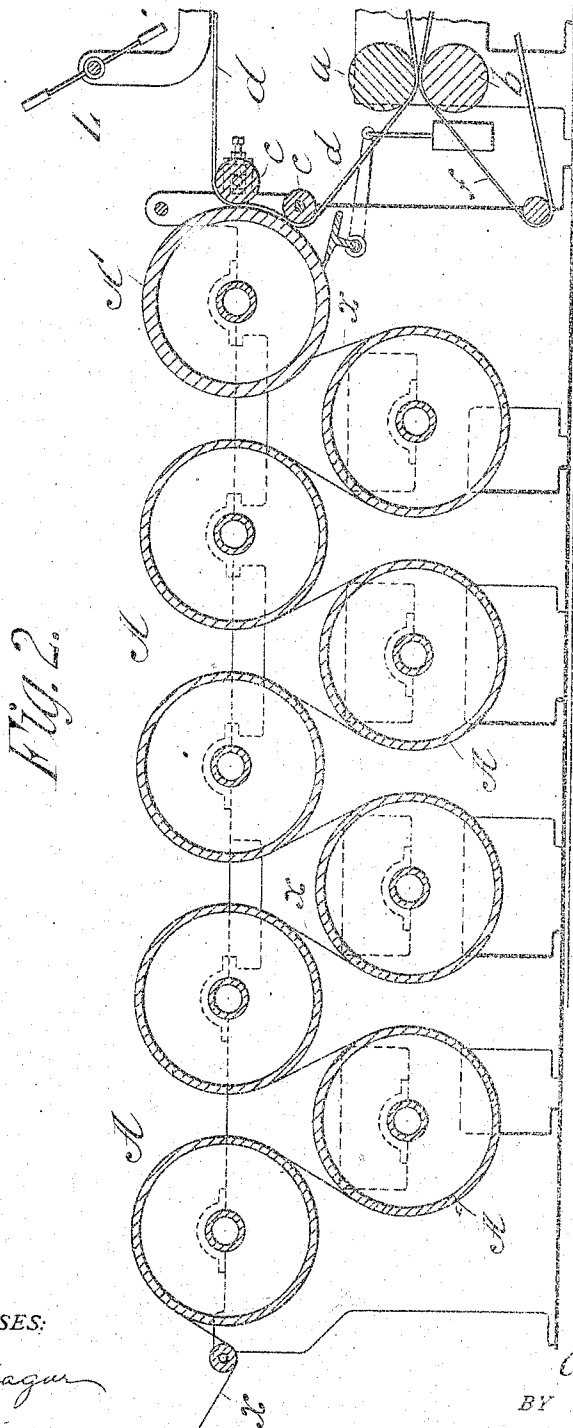


Fig. 2.

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WEB FEEDING AND DRYING APPARATUS FOR PAPER-MACHINES.

1,022,379.

Specification of Letters Patent. . . Patented Apr. 2, 1912.

Application filed December 1, 1911. Serial No. 663,195.

To all whom it may concern:

Be it known that I, CHARLES E. POPE, a citizen of the United States of America, and resident of Holyoke, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Web Feeding and Drying Apparatuses for Paper-Machines, of which the following is a full, clear, and exact description.

This invention particularly relates to the drying apparatus of a Fourdrinier paper machine, and more particularly to the drying apparatus which includes a series of steam drier drums to be employed in conjunction with or as a part of a machine for making a very thin web of paper, such as tissue or news papers.

The particular object of this invention is to so impart heating actions to the web after it emerges from the wet end of the Fourdrinier machine and especially upon coming onto the first drier drum of the series that the web instead of adhering and being carried entirely around by the first drier drum will readily cleave away from such drum to assume its proper direction or course of travel to the next drum. This is a matter of extreme importance in the drying apparatus of a machine for making extremely light and thin tissue or other paper.

The invention is described in conjunction with the accompanying drawings and is set forth in the claims.

In the drawings:—Figure 1 is a side elevation including the forward end portion or web part of a paper machine and the drier drums. Fig. 2 is a longitudinal vertical sectional view through the same.

In the drawings at the right hand portion of the views, the means for forwardly advancing the very thin wet web of paper toward the driers or what may be termed the drawing out means, is indicated as comprising a pair of press rolls *a* and *b*, between which run the endless aprons or bands of felt *d* and *f*, the upper endless band *d* being of harder felt while the one *f* is of softer felt as usual, so that in practice the wet web of paper will adhere to and be carried along by the harder felt apron, and such harder felt apron *d* passes forwardly upwardly beyond the guide rolls *c c* in proximity to which is the first drier drum *A*.

In addition to the first drier drum *A* are

the other drums *A, A*, here shown as six in number, in upper and lower tiers, the first drum *A* having its location at the level of the upper tier.

a represents the web of paper, the course of which is indicated as passing first upwardly around the first drum, thence successively under the drums of the lower tier alternated by passages upwardly around the drums of the upper tier as usual.

The first drum *A* is made with its walls of greater thickness than are the walls of the other drums, so that the first drum may withstand greater steam pressure as required therein than that to which the other drums are subjected.

B represents a pipe understood as receiving steam from a suitable source and having connection through the journal of the first drier drum *A*,—*D* representing the pipe for carrying out exhaust water accumulated from condensation in the first drum.

G represents a pipe understood as receiving and independently carrying steam from a suitable source and at a pressure different from that supplied through the pipe *B* into the first drier drum. This pipe *G* ranges horizontally along the back of the drier apparatus suitably near the ends of the drums, and branch pipes *G*² lead from this common steam supply pipe *G* into all of the drums *A A* of the series, excepting, of course, the first drier drum *A*, the connection being through the journals of the several drums.

J J represent pipes individual to the drums *A* for taking the exhaust and accumulated water of condensation to the common waste pipe *k*.

The pressure of steam to be maintained in the first drier drum as supplied by the steam pipe *B* is greater than that supplied into all of the rest of the drums through the steam pipe *G* to give correspondingly a higher temperature to the first drum than that imparted to the rest of the drums. In practice, pressure to be maintained in the first drum is from 15 to 20 pounds, while that maintained in the remainder of the drums is usually from 5 to 8 pounds.

The web in its extremely wet condition coming to and passing partially around the first drier drum *A*, being subjected to the higher heat thereof has so great a portion of

the moisture therein removed therefrom that the web instead of adhering to the first drum to be carried entirely around thereof or requiring to be stripped therefrom by a doctor, which might either rupture or distort the web, will cleave away, or peel, as it were, from the peripheral surface of the drum about on the approximately tangential line as represented below and to the left of the initial drum. And by the removal of a considerable portion of the moisture from the web so that it reaches the next drum in a much less wet condition, and the heat of such drum and the succeeding drums being comparatively low, the further action to complete the drying of the paper is gradual and conducive to the best results. As an assistance to the removal of the water carried in the wet web when it is brought by the drawing out means from the paper machine onto the first drier drum, I employ a fan L which has its location above and to the rear of the first drum, and is rotated in such a direction that its revoluble blades force the air more or less nearly horizontally and forwardly relatively to the top of the first drier drum A over and around which the web is passing. This fan, the blades of which are understood as extending longitudinally relatively to and in parallelism with the axis of the first drier drum, is effective for blowing the moisture in the form of a mist from the web to become dissipated in the atmosphere, and greatly accelerates the web drying action.

The temperature in the first drier drum A' may be readily increased or diminished, as occasions or conditions may require, to accord with the thickness of the web and the degree of moisture being carried therein. And inasmuch as ingredients of the paper stock, or chemicals, such as sizing, alum, coloring matter, etc., affect the nature of the web of paper as regards its tendency to adhesion against the first drier, it becomes necessary under different conditions that the temperature of such first drier shall be varied to accord with the adhesive nature of the web, and so that, in the running, the paper, of whatever character or nature, will readily and with certainty cleave away or peel from the smooth surface of the drier. And by maintaining the periphery of the first drier drum in a bright and smooth condition with the capability of varying the temperature in such drum, it becomes possible in my im-

proved machine to run the paper web around the drier drum without the requirement of the felt apron or blanket heretofore commonly employed.

I claim:—

1. In the drying apparatus of a paper machine, a series of drier drums, means for supplying steam into the first one of the drums, and independent means for supplying steam under a different pressure into the other drums of the series.

2. In the drying apparatus of a paper machine, a series of drier drums, a steam pipe for supplying steam at a given pressure into the first one of the drums, another pipe for carrying steam under a different pressure, and branches leading from said second pipe to connection into the other drums of the series.

3. In the drying apparatus of a paper machine, a series of drier drums, the first one thereof having its walls thicker than the walls of the other drums, means for supplying steam into the first one of the drums, and independent means for supplying steam under a different pressure into the other drums of the series.

4. In a drying apparatus of a paper machine, a series of drier drums, means for supplying steam thereinto and a revolubly bladed fan located above and to the rear of the first drum and operable to force air forwardly and across the top of such drum.

5. In a drying apparatus of a paper machine, a series of drier drums, means for supplying steam into the first one of the drums and independent means for supplying steam under a different pressure into the other drums of the series, and a revolubly bladed fan located above and to the rear of the first drum and operable to force air forwardly and across the top of such drum.

6. The method of drying a wet web of paper which consists in subjecting the web initially to the drying action of a rotary drum having a high degree of heat therein and thereafter subjecting the partially dry paper to the action of other drums heated to a lower degree.

Signed by me at Springfield, Mass., in presence of two subscribing witnesses.

CHARLES E. POPE.

Witnesses:

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WM. S. BELLOW.