

Oct. 13, 1931.

A. E. COFRIN
PAPER MAKING MACHINE
Filed Dec. 26, 1928

1,826,735

FIG. 1.

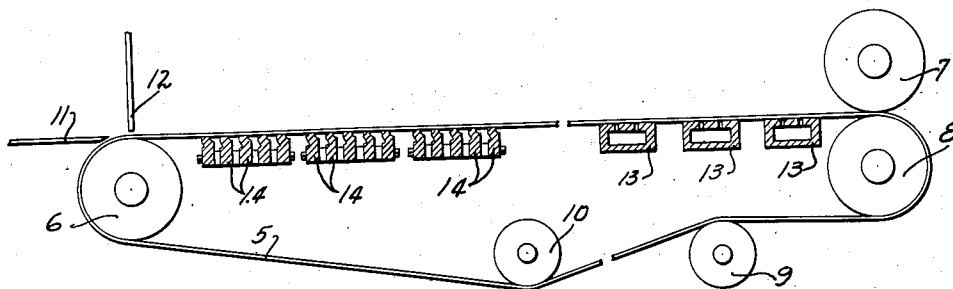


FIG. 2.

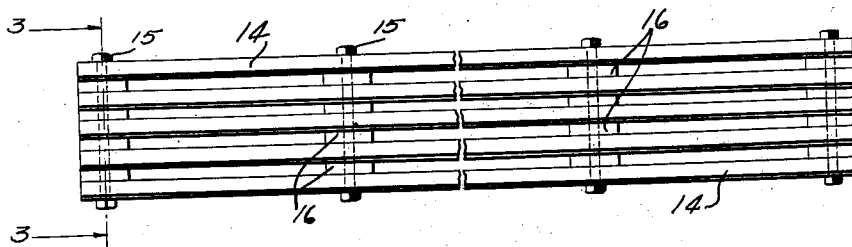


FIG. 3.

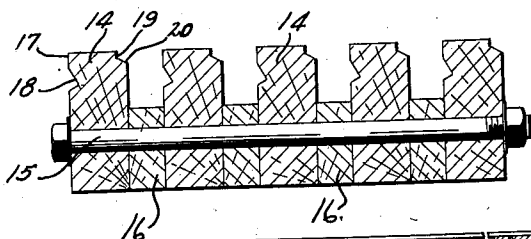
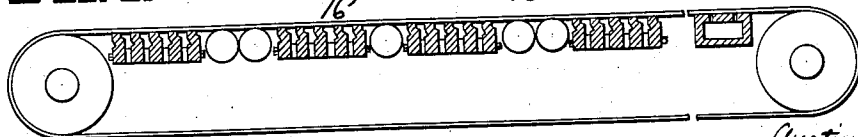


FIG. 4.



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PAPER MAKING MACHINE

Application filed December 26, 1928. Serial No. 328,453.

The invention relates to paper making machines of the Fourdrinier type and more particularly to apparatus associated with the Fourdrinier wire for removing water from the pulp after leaving the breast roll.

In my prior United States Letters Patent No. 1,623,526 dated January 5, 1926, I have pointed out certain disadvantages in the use of the usual tube rolls as they are customarily used, such as the limiting of the speed of the machine and the formation of a "mushy" or streaked product and have there disclosed a plurality of relatively broad, flat bars which have been found to give results superior to that of the usual tube rolls as such rolls are usually operated. Upon further experimentation I find that still further improvements in the character of the sheet being formed can be effected by the apparatus of the present invention which consists in substituting for some or all of the usual tube rolls a plurality of relatively narrow, closely spaced scraper members associated with the travelling wire acting on the pulp after leaving the breast roll. As is commonly known, the stock flowing over the Fourdrinier wire is more or less in streaks and in the case of tissue papers these streaks are very noticeable and result in a non-uniform product, both in texture and appearance. By the present invention the large number of contacts afforded by the closely spaced scraper members break or do away with these streaks to such an extent that a superior paper product is produced. I also find that by providing the scraper members with a recess at their rear side a small body of water is formed at this point which by its capillary action has a favorable effect upon the pulp by acting upon the bubbles and other disturbing factors that may be present after going over the scraping member or members.

A further object of the invention is to provide means for inducing a slight suction on the forming sheet during its entire progress on the travelling wire from the breast roll to the discharge end of said wire.

In the drawings Fig. 1 is a diagrammatic side elevation view of a Fourdrinier machine embodying the invention;

Fig. 2 is a plan view of one of the seepage removing units;

Fig. 3 is a detail sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a view similar to Fig. 1, showing certain modifications.

Referring to the drawings the numeral 5 designates the usual Fourdrinier wire belt or screen, 6 the breast roll, 7 and 8 the couch rolls and 9 and 10 tension rolls. An apron board 11 and a slice board 12 are arranged adjacent the breast roll in known manner and vacuum boxes 13 are associated with the wire, as usual.

In the position usually occupied by some or all of the tube rolls there is provided, according to the present invention, a series of relatively narrow, relatively closely spaced scraper members 14, extending the width of the machine, over the flat upper surfaces of which the wire 5 travels. For convenience in handling and assembling, a plurality of these members are secured together by bolts 15 and held in spaced relation by spacing blocks 16 interposed between but terminating well below the upper parts of said members. The units thus formed are mounted adjacent each other, as shown, by way of example, in Fig. 1, and they may be placed between the breast roll 6 and the suction boxes 13 so as to provide for a mild suction or vacuum effect on the forming sheet during its entire progress along the Fourdrinier wire. By using a mild vacuum during the formative period of the sheet more of the fine fibres that are usually lost in the seepage are retained as the mild vacuum tends to seal the interstices in the forming sheet and thus hold more of the fine fibres therein. In the arrangement shown in Fig. 4 the scraping devices are shown associated with a few tube rolls 14' which may be arranged singly or in multiple between the scraping devices 14 and obtain some of the advantages of the invention.

As shown, the leading edges 17 of each scraper member are preferably formed at right angles to the wire. This angle may be varied to some extent, but it is preferable to provide a sharp angle at the juncture of

said edges with the upper surfaces of said members and a longitudinally extending groove 18 is also provided on this side of each member to facilitate the flow of seepage.

5 The rapidly moving film of water and pulp carried along over the members coming in contact with the angle of said members successively is stripped off without producing objectionable disturbances of the film of material upon the wire and the great number of contacts established by this arrangement has the effect of eliminating the wavy flow of the water and pulp and thus does away with the streaked effects of such waves. The water passing through the wire in contact with the wet upper surface of the top of each bar, by surface tension effect, is dragged over the surface of the bar and produces a suction effect to draw water downwardly from the film of material upon the upper surface of the wire. The water seeping through the screen as it travels between the bars is also effectively prevented from working back up into the material on the wire by the scraping action of the members 14. The trailing edge 19 is also preferably recessed or cut back from the general plane of this side of the bar with an inclined lower side 20. The object of this recess is to provide a sort of small well that holds the water and actual experiments demonstrate that it has the effect of removing bubbles or other disturbing factors, which I believe is due to a capillary effect of the water temporarily retained in these recesses. After passage over the scraper members 14 the wire with the pulp forming thereon into a sheet may be led over suction boxes 13 in the usual manner. The bars 14 are preferably formed of hardwood but may be formed of any other suitable material.

It has been found that the invention above described produces results superior to that of my prior patent heretofore mentioned.

I desire it to be understood that this invention is not to be limited to any particular arrangement or combination of parts except insofar as such limitations are included in the claims.

What I claim as my invention is:

50 1. In a Fourdrinier paper making machine, the combination of a travelling wire, and means for removing moisture from the forming film upon said wire comprising a series of relatively narrow, closely spaced scraper members over which the wire passes.

2. In a Fourdrinier paper making machine, the combination of a travelling wire, means for removing moisture from the forming film upon said wire and preventing a streaked formation in said film comprising a series of narrow, closely spaced, flat-surfaced members over which the wire passes, the advancing edge of said members being a scraping edge, and means at the trailing

edge of said members forming a temporary water-collecting space.

3. In a Fourdrinier paper making machine, the combination of a travelling wire, and means for removing moisture from the forming film upon said wire comprising a series of stationary scraping members over which the wire passes, the trailing edges of said members having means forming a temporary moisture-collecting space.

4. In a Fourdrinier paper making machine, the combination of a travelling wire, and means for removing moisture from the forming film upon said wire comprising a series of stationary scraping members over which the wire passes, said members having longitudinally extending grooves in their leading side below their top portions.

5. In a Fourdrinier paper making machine, the combination of a travelling wire, and means for removing moisture from the forming film upon said wire and preventing a streaked formation of said film, comprising a series of flat-topped scraping members having longitudinally extending grooves in their leading side below said top portions and recessed at their trailing side adjacent said top portions.

6. In a Fourdrinier paper making machine, the combination of a travelling wire, suction boxes, seepage removing means comprising a plurality of units arranged in advance of the suction boxes and at the breast roll end of the machine, each unit comprising a series of narrow scraper bars, spacers between the bars, and means for connecting said bars and spacers together.

7. In a Fourdrinier paper making machine, the combination with the travelling wire, of means for creating a mild suction effect upon the forming sheet during its entire progress along said wire from the breast roll to the discharge end of the machine.

In testimony whereof, I affix my signature.

AUSTIN E. COFRIN.