

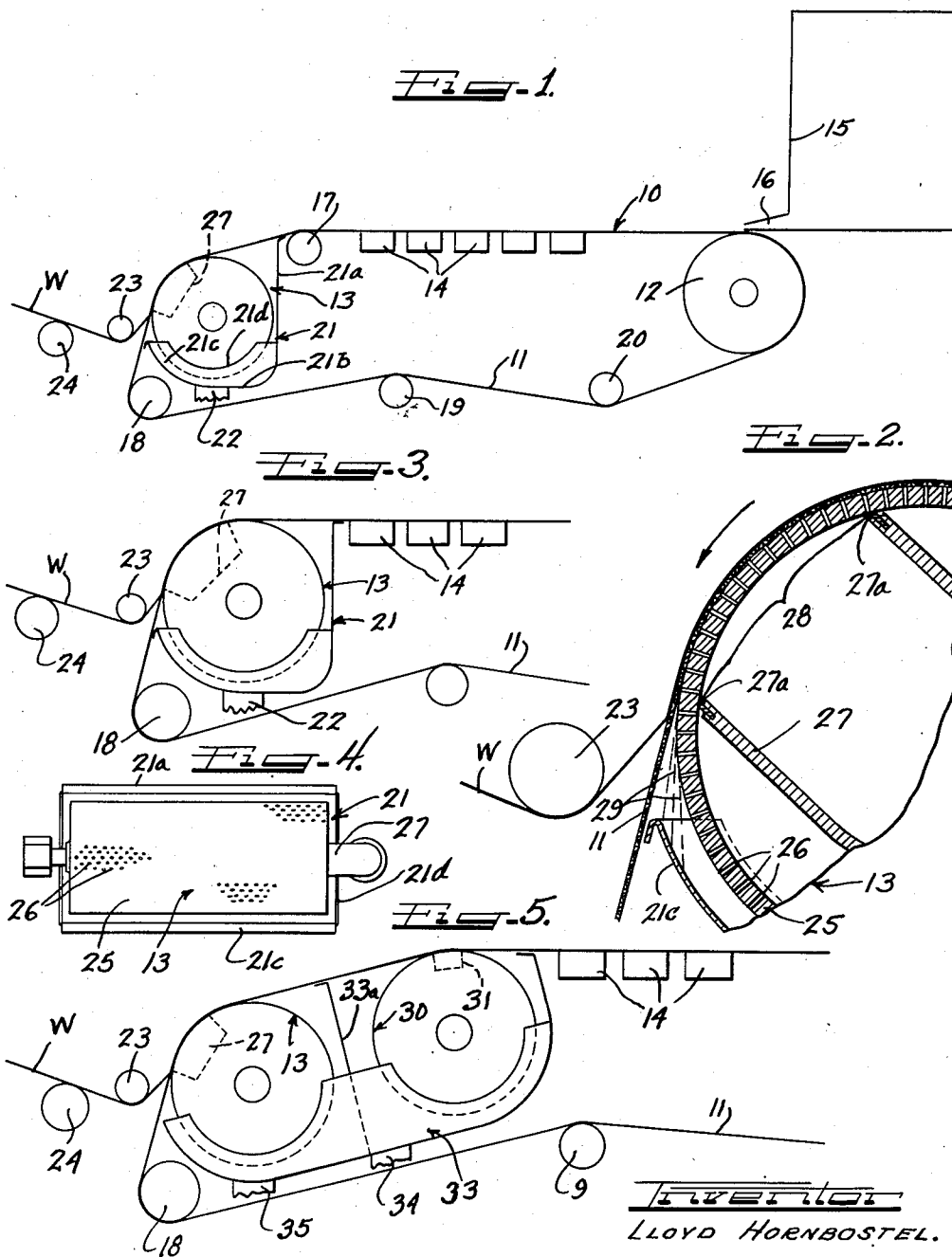
Feb. 20, 1945.

L. HORNOSTEL

2,369,674

COUCH ROLL ARRANGEMENT FOR PAPER MACHINES

Filed May 13, 1942



LLOYD HORNOSTEL.

Charles W. Hills

UNITED STATES PATENT OFFICE

2,369,674

COUCH ROLL ARRANGEMENT FOR PAPER MACHINES

Lloyd Hornbostel, Beloit, Wis., assignor to Beloit Iron Works, Beloit, Wis., a corporation of Wisconsin

Application May 13, 1942, Serial No. 442,755

3 Claims. (Cl. 92—44)

This invention relates to endless band type or Fourdrinier type paper making machines and more particularly to couch roll arrangements for such machines which will eliminate rewetting of the paper with liquids extracted therefrom.

In accordance with this invention the forming wire of a paper machine is directed around a suction couch roll so as to subject the web of paper carried thereby to the suction in the roll and thereby extract water from the web. It has heretofore been customary to allow the web and forming wire to remain on a suction couch roll after the same have passed beyond the suction area of the roll. In such arrangements water or other liquid drawn into the holes of the rotating couch roll cylinder or shell will be released as soon as the holes pass beyond the suction area. Inasmuch as the cylinder or shell is rotating, the water entrained in these holes will be thrown back into the wire and web by centrifugal force.

In accordance with this invention, both the web and the forming wire are directed away from the couch roll shell before the vacuum in the holes of the shell is released. In this manner, any water which is discharged out of the holes after the vacuum therein is released can be so directed as to prevent its reentry into the wire and web. In accordance with this invention a baffle or save-all is interposed between the wire and the shell for intercepting the water discharged from the shell before it reaches the wire.

It has heretofore been customary to permit the forming wire to follow around the under side of the couch roll for passage back to the breast roll of the machine. According to this invention, however, a wire roll is mounted adjacent the couch roll to receive the wire from the roll before the wire starts on its path back to the breast roll. A save-all trough is disposed around the rotating shell of the couch roll within the loop of the wire so as to intercept any liquids discharged from the shell. The wire roll is positioned to separate the wire from the shell before the vacuum in the holes of the shell is released. For example the wire and web can be removed from the shell at a point immediately adjacent the offgoing seal of the couch roll so that the suction area of the roll will not be directly vented since it will be covered by the web and at the same time the holes, in passing over the seal, will have the vacuum therein retained by the seal. Thus high vacuum can be maintained in the suction area of the roll and the web can be out of the path of liquids discharged from the roll when

vacuum in the holes of the roll shell is eventually released.

A paper roll is also provided for stripping the web off of the wire as soon as the suction effect on the web is broken.

It is, then, an object of this invention to prevent rewetting of paper webs as the same pass beyond the suction area of a suction couch roll.

A further object of the invention is to provide a directing roll within the loop of a Fourdrinier forming wire for guiding the wire away from a suction couch roll at the point where the suction effect on the couch roll shell is terminated.

A further object of this invention is to provide an improved couch roll arrangement for Fourdrinier type paper making machines which prevents rewetting of a web of paper on the machine.

Another object of this invention is to intercept water discharged from the rotating shell of a suction couch roll to prevent rewetting of the web of paper passing around the couch roll.

Another object of the invention is to remove the forming wire of a paper machine from the rotating shell of a suction couch roll before the vacuum in the holes of the shell is completely broken.

Other and further objects of the invention will be apparent to those skilled in the art from the following detailed description of the annexed sheet of drawings, which, by way of preferred examples, illustrate several embodiments of the invention.

On the drawing:

Figure 1 is a diagrammatic side elevational view of a Fourdrinier type paper making machine having a couch roll arrangement in accordance with this invention.

Figure 2 is an enlarged fragmentary vertical cross-sectional view of the couch roll arrangement shown in Figure 1.

Figure 3 is a fragmentary view similar to Figure 1, showing a slightly modified couch roll arrangement.

Figure 4 is a top plan view of a suction couch roll and save-all trough in accordance with this invention.

Figure 5 is a diagrammatic fragmentary view similar to Figure 3 illustrating a couch roll arrangement according to this invention coupled with a primary suction couch roll.

As shown on the drawing:

In Figure 1 the reference numeral 10 designates generally a Fourdrinier type paper making machine including a looped forming wire 11 trained between a breast roll 12 and a couch roll 13. A

plurality of stationary suction boxes 14 are mounted within the loop of the wire 11 under the upper run thereof between the breast and couch rolls. A head box 15 is provided adjacent the breast roll end of the machine for discharging stock through stock inlet 16 onto the upper run of the wire.

In accordance with this invention a wire roll 17 is provided adjacent the last suction box 14 and the upper run of the wire is directed over this wire roll to extend in a somewhat downwardly sloping direction to the couch roll 13. The wire, after passage over the couch roll 13, does not extend around the under side of this roll but, in accordance with this invention, is trained over a wire roll 18 positioned somewhat beyond the couch roll 13 at a level below the roll. The wire then travels over a tensioning roll 19 and under another wire roll 20 back to the breast roll 12.

A save-all tank or trough 21 is disposed around the couch roll 13 and has a front end wall 21a extending vertically from the bottom 21b of the trough into closely spaced relation with the upper run of the wire at a point adjacent the wire roll 17. The trough also has an arcuate rear end wall 21c extending from the bottom wall 21b thereof between the roll 13 and the wire 11 to a point adjacent the wire so that the wire run between the rolls 13 and 18 will clear the wall 21c in closely spaced relation. Front and rear side walls 21d extend above the bottom end of the roll 13 so that any liquid collected in the trough will discharge through a drain pipe 22 communicating with the bottom of the trough.

The web of paper W formed on the forming wire 11 is stripped from the wire by being directed under a roll 23 and thence over another roll 24 positioned adjacent the couch roll 13.

As best shown in Figure 2, the couch roll 13 includes a rotating cylinder or shell 25 having holes or perforations 26 therethrough. The shell 25 rotates around a suction gland 27 which is stationarily mounted in the shell and which has seals 27a thereon defining therebetween a localized suction area 28 on the shell.

The forming wire 11 is guided onto the shell 25 in advance of the suction area 28 so as to carry the web W over this suction area. However, in accordance with this invention, the wire 11 is removed from the shell 25 to carry the web W therewith before the vacuum in the holes 26 of the shell is completely broken by passage of the holes beyond the offgoing seal 27a. In other words the wire roll 18 of Figure 1 directs the wire 11 off of the shell 25 at a point adjacent the offgoing seal 27a so that the wire is removed from the shell before any water in the holes 26 is released for centrifugal discharge out of the holes. As shown in Figure 2, this water will be released from the holes 26 in streams 29 extending tangentially of the shell 25 but the wire 11 is positioned outwardly from these streams 29 so that the streams will impinge against the wall 21c of the trough 21 to be collected in the trough. As a result the web W will not be rewetted by any liquids extracted therefrom. The paper roll 23 will strip the web W from the wire 11 just as soon as the suction effect on the web is broken by passage of the wire away from the suction area 28.

The upper run of the forming wire 11, as shown in Figure 1, slopes downwardly from the wire roll 17 to the couch roll 13 so that the upper run includes a substantially horizontal portion extend-

ing from the breast roll 12 to the roll 17 and the downwardly sloping portion extending from the roll 17 to the couch roll. If desired, on the other hand, the couch roll 13 can be on the same level with the breast roll 12 so that, as shown in Figure 3, the wire will have a substantially horizontal upper run between the breast and couch rolls. Also, as shown in Figure 3, the roll 17 can be eliminated and the suction boxes such as 14 can extend up to the save-all trough 21.

As shown in Figure 5 a primary suction couch roll 30 can be disposed within the loop of the wire 11 between the last suction box 14 and the couch roll 13. This primary suction couch roll 30 can have a suction area defined by a stationary suction box such as 31 for acting on the wire and web W before they reach the suction area 28 of the couch roll 13. The primary couch roll 30 will have an additional dehydrating effect upon the web W without, however, imparting a frictional drag on the wire 11 such as occurs when stationary suction boxes 14 are used to dehydrate the web as much as possible.

A modified save-all trough 33 can be used to collect water discharged by centrifugal force from the rotating shells of both rolls 13 and 30. The roll 30 is arranged within the loop of the wire so that the wire will be separated from the suction area thereof adjacent the offgoing seal of the suction box 31 to prevent rewetting of the web by centrifugal discharge of water out of the holes in the rotating shell of the roll. The trough 33 is similar to the trough 21 but can have a central dividing wall 33a between the rolls 13 and 30 so that water thrown out of the roll 30 will not be impinged against the roll 13. A drain 34 can be provided for that portion of the trough housing the roll 30 while a second drain 35 can be provided for that portion of the trough housing the roll 13.

From the above descriptions it will be understood that this invention now provides couch roll arrangements for Fourdrinier type paper making machines which eliminate rewetting of the paper web as it passes beyond the suction area of the couch roll.

It will, of course, be understood that various details of the invention may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. A Fourdrinier type paper making machine comprising a breast roll, a first wire roll in spaced lateral relation therefrom, a couch roll beyond the wire roll at a level below the top of the wire roll, said couch roll including a foraminous cylinder and a suction gland in the cylinder having spaced opposed on-coming and off-going seals acting on the cylinder to define a suction area, a second wire roll beyond the couch roll at a level beneath the top of the couch roll, a looped forming wire around all of said rolls and having an upper run extending substantially horizontally from the breast roll to the first wire roll and then sloping downwardly to the second wire roll, said first wire roll guiding the wire onto the cylinder of the couch roll in advance of the suction area, said second wire roll directing the wire off of the cylinder at the off-going seal before suction in the holes of the cylinder is completely broken, a save-all trough in the loop of the wire receiving the cylinder therein, said trough having a

first wall extending between the cylinder and the first wire roll into closely spaced relation with said forming wire together with a second wall extending between the cylinder and second wire roll into closely spaced relation with the forming wire, and a stripping roll for stripping a web of paper from the forming wire as soon as the suction effect on the web is broken by removal of the wire from the cylinder.

2. In a Fourdrinier paper making machine including a looped forming wire, a suction roll having a perforated cylinder receiving the wire around an area thereof, said suction roll having a suction gland in the cylinder with spaced opposed off-going and on-coming seals defining a suction area on the cylinder portion covered by the wire, and means in the loop of the wire directing the wire tangentially off of the cylinder at a point immediately adjacent the off-going seal where the perforations in the cylinder have vacuum retained therein by said seal and where said perforations are not in direct communication with the suction area whereby the wire is outward from tangential streams of liquid released from said perforations after these perforations pass the off-going seal.

3. A Fourdrinier type paper making machine comprising a breast roll, a couch roll spaced from the breast roll, said couch roll including a foraminous cylinder and a suction gland in the cylinder having spaced opposed on-coming and off-going seals acting on the cylinder to define a suction area, another roll beyond the couch roll at a level beneath the top of the couch roll, a looped forming wire around all of said rolls, said roll beyond the couch roll directing the wire off the cylinder at the off-going seal before suction in the holes of the cylinder is completely broken, a save-all trough in the loop of the wire receiving the cylinder therein, said trough having a first wall extending between the cylinder and breast roll into closely spaced relation from said forming wire together with a second wall extending between the cylinder and roll beyond the couch roll into closely spaced relation with the forming wire, and a stripping roll for removing a web of paper from the forming wire as soon as the suction effect on the web is broken by removal of the wire from the cylinder.

LLOYD HORNBOSTEL.