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REVERSE SUCTION PRESS ASSEMBLY

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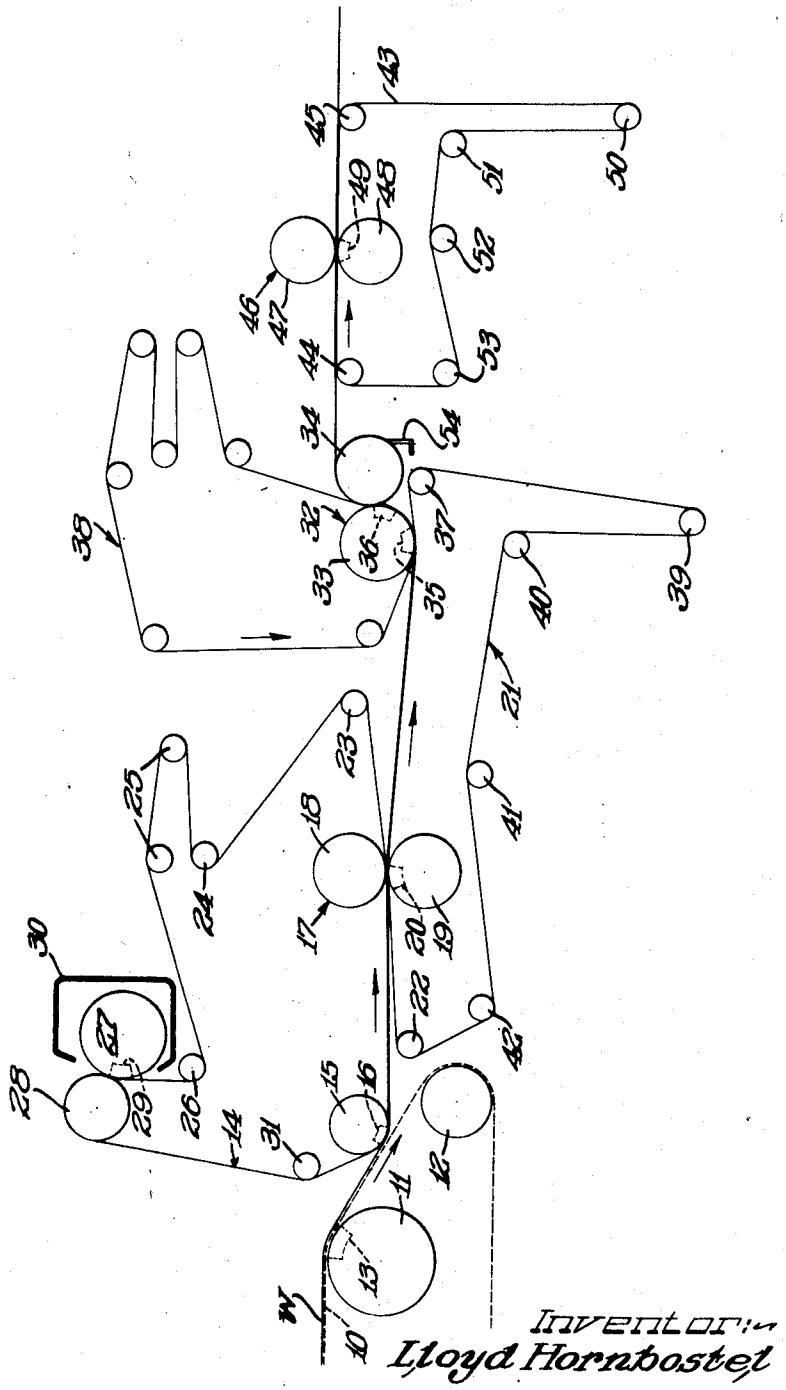

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REVERSE SUCTION PRESS ASSEMBLY

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This invention relates to a paper machine press section which conveys a freshly formed moist web of paper from its forming surface through a plurality of suction presses without any open draws and transfers the web a plurality of times from one conveying felt to another while providing a self-dumping doctor arrangement for at least one of the suction presses.

Specifically, the invention deals with a suction press assembly for a Fourdrinier type paper making machine wherein a first suction press transfers the web from a transfer felt to a bottom felt while dewatering the web, wherein this bottom felt then conveys the web to a suction transfer roll in advance of a vertical passage pressure nip of a second suction press to again transfer the web to another felt for reverse suction treatment of the web.

According to this invention, a pick-up felt or transfer felt is directed against a web on a Fourdrinier forming wire at a point along the upper run of the forming wire located between the suction couch roll and the turning roll. A suction transfer roll is provided within the loop of this felt to remove the web from the wire. The felt then conveys the web over a bottom felt and into the nip of a first suction press. This first suction press has vertically aligned rolls defining a horizontal nip with a bottom suction area that transfers the web to the bottom felt. The pick-up or transfer felt is then separated from the web and cleaned by a suction roll en route back to the suction transfer roll. The bottom felt conveys the web on its top face to a reverse press felt which is urged against the web by a combination suction transfer and suction press roll. This roll has a suction transfer nip acting through the reverse press felt to transfer the web from the bottom felt to the reverse press felt. The web on the reverse press felt then follows around the combination transfer and suction press roll to an upward passage vertical nip where water is extracted through the opposite or top face of the web. This second suction press has a plain roll receiving the web therearound after passage through the vertical nip. A self-dumping doctor on this plain roll maintains the press in a clean condition. The web is then conveyed to another felt for conveyance through a third suction press.

A feature of this invention includes a suction roll for cleaning the transfer felt.

Another feature of the invention resides in the provision of horizontally arranged suction press rolls defining an upward passage self-draining vertical nip and a self-dumping doctor for cleaning the press.

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It is, then, an object of this invention to provide a paper machine press section equipped with a plurality of suction presses and felt runs so arranged that the paper web does not have an open draw, and is subjected to reverse suction treatments through clean felts.

Another object of the invention is to provide a reverse suction press assembly for Fourdrinier type paper making machines wherein the reverse press is so arranged that its plain roll can have a self-dumping doctor coacting therewith for maintaining a clean suction nip.

Another object of the invention is to provide a suction press section for Fourdrinier paper making machines wherein a suction transfer roll cooperates with a pick-up felt that conveys the web into the first suction pressure nip and is continually cleaned by a separate suction roll in advance of the suction transfer roll.

A still further object of the invention is to provide an improved felt run arrangement for a paper machine press section wherein a web passing through the section never has any exposed open draws and wherein the suction press rolls are arranged to successively act through opposite faces of the web.

Other and further objects and features of this 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 example only, illustrates a preferred embodiment of the invention.

On the drawings:

The single figure of the drawings is a diagrammatic representation of the preferred form of reverse suction press section of the present invention.

As shown on the drawings:

A Fourdrinier paper making machine forming wire **10** trained over a suction couch roll **11** and around a wire turning roll **12** conveys a newly formed wet web of paper W over the suction area **13** of the couch roll to a pick-up felt or transfer felt **14** which is urged into contact with the web by a suction transfer roll **15** at a point on the upper run of the wire between the suction couch roll **11** and the turning roll **12**. The transfer roll **15** has a suction area **16** acting through the felt **14** to effect a suction transfer of the web onto the felt. The suction transfer roll **15** is not backed by a roll within the loop of the wire **10** and only urges the felt **14** gently against the web W.

The felt 14 conveys the web W on the under face thereof along a horizontal run to the horizontal nip of a first suction press 17. This press 17 has a plain top roll 18, a bottom suction roll 19, and a suction area 20 in the roll 19 at the nip between the rolls. A bottom felt 21 is guided by a guide roll 22 along an upper horizontal run into the nip of the first press where it covers the web on the felt 14.

After passage through the nip of the press 17, the felt 14 is trained upwardly around a guide roll 23 away from the web on the upper run of the felt 21. The suction area 20 serves to transfer the web from the bottom run of the felt 14 to the top run of the felt 21. The felt 14, after passage around the roll 23, then passes around a stretcher roll 24 to several inside loop guide rolls 25 and thence around an external roll 26 to travel vertically upward through a vertical passage nip between a suction roll 27 and a plain roll 28 cooperating with the suction roll. The roll 27 has a suction area 29 acting through the web-contacting face of the felt 14. The suction roll 27 cleans and dries the felt 14 before it recontacts the web W. A save-all collector 30 is provided around the roll 27 to receive water thrown from the roll. The felt, after passage over the suction area 29, then travels around the top of the roll 28 to an inside loop guide roll 31 immediately in advance of the suction transfer roll 15.

The felt 21 with the web thereon passes from the nip of the suction press 17 under a reverse press 32 composed of a double suction area-equipped suction roll 33 and a cooperating plain roll 34. The rolls 33 and 34 are horizontally aligned to provide an upward passage vertical nip therebetween.

The suction roll 33 has a suction transfer area 35 in the bottom portion thereof and a second suction area 36 in the side thereof at the nip between the rolls 33 and 34. The upper run of the felt 21 extends beyond the suction transfer area 35 and is trained around an inside loop guide roll 37 which directs the web on the upper run of the felt against a reverse press felt 38. The reverse press felt 38 is trained under the suction roll 33 and the transfer area 35 removes the web from the felt 21 to the web 38. The felt 21 then travels alone around the roll 37 and down to a stretcher roll 39 and thence around outside loop guide rolls 40 and 41 to an inside loop guide roll 42 and thence back to the guide roll 22.

The reverse press felt 38 conveys the web upwardly through the nip of the press 32 and the suction area 36 acts through the felt to remove water through the top or non-wire side face of the web. The web then travels around the plain roll 34 to another felt 43 having a horizontal top run between guide rolls 44 and 45. This horizontal upper run extends through the horizontal nip of another suction press 46. The press 46 is composed of a top plain roll 47 and a bottom suction roll 48 having a suction area 49 at the horizontal nip between the rolls. The felt 43 travels downwardly from the roll 45 to a stretcher roll 50 and thence around outside loop guide rolls 51 and 52 to an inside loop guide roll 53 and thence back to the roll 44.

The plain press roll 34 of the reverse press 32 has a self-dumping doctor or scraper blade 54 coacting therewith on the descending side thereof so that any foreign matter or broken bits of paper will be removed from the roll surface before it re-enters the web. Since the doctor 54 is vertically disposed, any foreign material received thereon from the roll will be discharged by gravity.

From the above descriptions, it will be understood that the paper web W on the forming wire 10 is transferred to the transfer felt 14 at a point on the wire between the suction roll 11 and the turning roll 12 by means of the suction transfer roll 15. The web is then conveyed on the under face of the horizontal run of the transfer felt 14 to the horizontal nip of the first suction press 17 where it is covered by a bottom felt 21. The web between the felts 14 and 21 is subjected to suction and pressure in the suction press 17 and water is removed from the web through the wire side face thereof and through the bottom felt 21. The bottom suction roll 19 of the first suction press 17 transfers the web to the bottom felt 21 and the transfer felt then travels alone through a cleaning suction roll assembly which opens up and dewaters the felt before it recontacts the web on the forming wire. The bottom felt then conveys the web on the top face thereof under a suction transfer area 35 of the suction roll of a reverse press 32. A reverse press felt 38 covers the nonwire side or top face of the web on the felt 21 and the suction area 35 is effective to transfer the web to this reverse press felt. The reverse press felt then conveys the web around the suction roll 33 of the reverse press 32 and through the vertical nip of the press where the web is subjected to a second press treatment and to suction acting through the reverse press felt. The suction area 36 pulls water out of the nonwire side or top face of the web. The web, after passage through the vertical nip of the reverse press, then travels around the plain roll of this press onto the upper horizontal run of another felt 43 which conveys the web through a third suction press 46.

It will be understood that the web W in its passage through the entire press section is not subject to any elongated unsupported open draws, is transferred a plurality of times from one conveying felt to another, is subjected to suction acting successively through opposite faces thereof, and is kept free of foreign matter by a self-dumping doctor coacting with the reverse press.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A reverse suction press assembly for a paper making machine which comprises a first suction press defining a horizontal suction nip, a second reverse suction press defining an upward passage vertical nip, a third suction press defining a horizontal suction nip, a looped transfer felt trained through the horizontal nip of the first suction press, a suction transfer roll in the loop of said transfer felt, a bottom felt trained through the horizontal nip of said first suction press coacting with the transfer felt to cover the web as it passes through said nip, said first suction press having the suction area thereof acting through said bottom felt to effect transfer of the web from the transfer felt to the bottom felt, said bottom felt having an upper run conveying the web under said reverse press, said reverse press having a suction roll with a reverse press felt trained therearound and through the upward passage vertical nip of the press, said suction roll of the reverse press felt having a suction transfer area acting through said reverse press felt on the web carried by the bottom felt to transfer the web

to the reverse press felt, said reverse press having a plain roll coacting with the suction roll and receiving thereover the web from the reverse press felt after passage of the web through the vertical nip, a self-dumping doctor coacting with said plain roll of the reverse press, and a second bottom felt having an upper run trained through said third press for receiving the web from the plain roll of the reverse press to convey the web through the horizontal nip of the third press.

2. A paper machine press section which comprises a plurality of suction presses having horizontal suction pressure nips, a reverse press between said suction presses having a vertical suction pressure nip, bottom felts for conveying a web through the horizontal nips of said presses, a reverse press felt for conveying the web through the vertical nip of the reverse press, a transfer felt for conveying the web to the first horizontal nip, a suction transfer roll acting through said transfer felt, and a separate suction cleaning roll acting through the outer face of said transfer felt.

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