

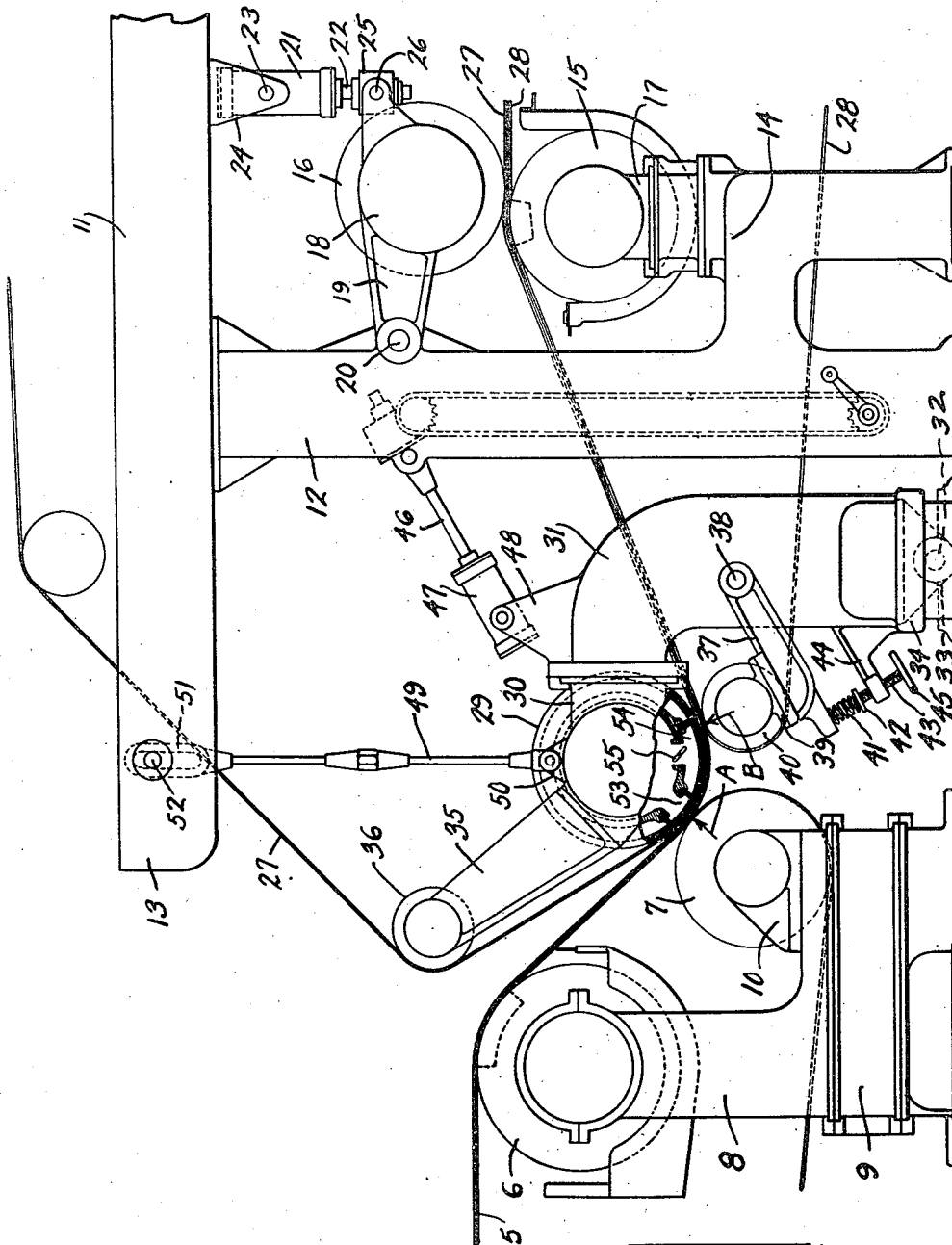
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PAPER MAKING MACHINE

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Att. 5

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PAPERMAKING MACHINE

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This invention relates to a paper making machine of the Fourdrinier type for the manufacture of soft tissue paper, and it is specifically directed to the take-off or suction transfer roll assembly of such machine.

It is one of the principal objects of this invention to simplify the construction of a suction transfer roll assembly for a paper making machine such as contemplated herein, and to improve the efficiency, operation and dependability of such assembly.

This invention has for its object to provide a wider or increased range of functions over those heretofore usually assigned to and performed by the suction transfer roll of a Fourdrinier paper making machine.

Another of the principal objects hereof resides in providing positive means to prevent an unsupported longitudinal draw or pull upon the paper sheet between the point of its withdrawal from the forming wire and its engagement by the initial or first press roll assembly. This effectively overcomes any tendency to stretch or rupture the sheet while it is in transit.

It is a further object hereof to provide an arrangement whereby the loop of the bottom felt is advanced or set ahead to a position where it is proximate the suction transfer roll whereby it is brought into direct opposition thereto for cooperation with the top felt and the paper sheet at the suction area of the transfer roll.

A further object of this invention is to provide a suction transfer roll that is adapted to perform a plurality of operations or dual functions such as the sucking of the paper sheet to the pick-up top felt from the forming wire, and the holding or retaining of the sheet on the top felt until it reaches the bottom felt where said sheet will become interposed between the two felts.

Also it is an object hereof to provide a transfer assembly in a paper making machine wherein spaced nips are defined with relation to the suction transfer roll, the said nips being respectively between said transfer roll and (1) the couch roll in the wire loop, and (2) a roll upon which the loop of the bottom felt is trained.

In this connection the present invention aims to provide means for effectively mounting the roll for the bottom felt loop preferably upon the same support with the suction transfer roll to oppose the latter. By reason of this assembly the transfer roll will perform cooperative functions with both the top felt and the bottom felt.

Additional aims and advantages of this invention will be apparent to persons skilled in the

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art after understanding the construction and operation thereof from the following description. It is preferred to practice this invention in substantially the manner hereinafter described in detail and as more particularly pointed out in the claims. Reference is now made to the accompanying drawing that forms a part of this specification, in which,

The figure is a diagrammatic side elevation of the transfer end of the press section and the delivery end of the forming wire section of a paper making machine showing the instrumentalities of the present invention.

The delivery end of the forming wire 5 is formed in a loop by being trained upon the primary suction couch roll 6 and a second couch roll 7. The primary suction couch roll has its trunnions journaled in uprights 8 arising from a suitable base 9, and the couch roll 7 has its trunnions journaled in brackets 10 upon the top of the base 9. Above the delivery end of the assembly just described, there is an overhead support 11 that is mounted upon the tops of columns 12 that are spaced from the looped end of the forming wire in the manner shown to provide an overhanging portion 13 of said overhead support.

The initial or first press roll assembly is mounted upon the columns 12, which columns have an offset shelf 14. This press roll assembly comprises a lower suction press roll 15 that is yieldably opposed by the plain roll 16 to define a nip between said rolls. The trunnions of the lower suction press roll 15 are mounted in suitable bearings 17 that are secured to and arise from the shelf 14. The trunnions of the plain press roll 16 are journaled in bearings 18 carried by intermediate portions of horizontal arms 19 that have their ends nearest the columns 12 fulcrumed on pivots 20. The movable outer or free ends of the arms 19 are yieldably urged in a downward direction toward suction roll 15 by a plunger assembly comprising a cylinder 21 and a plunger rod 22, the cylinder being carried by trunnions 23 in lugs or ears 24 depending from the overhead support 11. The plunger rod 22 has an enlargement 25 from which trunnions 26 project horizontally and are engaged in bearings in the adjacent outer ends of the arms 19. The superposed top and bottom felts 27 and 28 respectively, with the intermediate paper sheet ply, are trained through the nip defined by the suction press roll 15 and opposing roll 16.

The suction transfer roll 29 yieldably opposes the couch roll 7 to define a nip through which

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the pick-up top felt 27 is trained in a manner so that it will contact the paper sheet while it is traveling on the delivery end loop of the wire. The trunnions of this transfer roll 29 are journaled in bearings 30 in the outer ends of a suitable rocking frame. This rocking frame comprises supporting members 31 of inverted L-shape the lower ends of which are provided with trunnions 32 that are movably mounted in bearings 33 in suitable base blocks 34. Beyond the bearings 30 for the suction transfer roll trunnions, the L-shaped frame members 31 are provided with upwardly inclined arms 35 for rotatably supporting an idle roll 36 upon which the pick-up top felt 27 is trained and from which the top felt travels to the nip defined by the suction transfer roll and couch roll 7.

The upright portions of the frame members 31 have arms 37 pivotally mounted thereon by means of studs 38 and the outer movable portions of these arms 37 are provided with bearing brackets 39 for journaling a roll 40 upon which the cover or bottom felt 28 is trained and from which said bottom felt travels in an upwardly inclined direction to the nip defined by the first press roll assembly. This arrangement positions the roll 40 in opposition to the transfer roll 29 and disposes the loop of the bottom felt 28 close to but spaced from the delivery loop of the forming wire 5. The roll 40 is yieldably urged toward the suction transfer roll by springs 41 that are interposed between the outer ends of the roll supporting arms 37 and follower disks 42 upon the adjacent ends of threaded rods 43 that are screwed into internally threaded bosses on brackets 44 and which may be turned by hand wheels 45 to adjust the tension of the springs 41. The roll 40 and the suction transfer roll 29 which it opposes define a suction nip that is spaced from the first nip which is defined by the transfer roll 29 and the couch roll 7. For convenience the two spaced nips are indicated by arrows on the couch roll 7 and bottom felt roll 40 and they are identified respectively by the characters A and B.

The assembly which is mounted upon and supported by the L-shaped frame members 31 is yieldably urged toward the couch roll 7 by a plunger 46 operating in a cylinder 47 that has a pivotal mounting upon brackets 48 on the upper portion of the frame members 31. In this manner the suction transfer roll yieldably opposes the couch roll 7, and said transfer roll is in turn yieldably opposed by the roll 40 upon which the bottom felt is trained, and there is only a short distance traversed by the transferred paper sheet before it is covered by the bottom felt 28. Adjustable suspension rods 49 for the roll 29, used during felt changing operations, have their lower ends pivotally mounted in ears 50 arising from convenient portions of the frame members 31, the upper ends of said suspension rods being provided with elongated eyes 51 that are engaged with a rod 52 extending horizontally across the overhang portion of support 11.

The suction area of the transfer roll 29 is of such dimension that it includes both the nips A and B. The transfer roll 29 has a suction passageway 53 opposite the nip A to be effective thereat and there is another passageway 54 that extends from alongside the first passageway at least to the second nip B. In this manner the suction area of transfer roll 29 is divided into two areas, one of which is wider than the other in its circumferential dimension. There is a control damper or flap valve 55 in the passageway 54 that

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effects a differential of suction between these respective passageways, such differential being effective upon the corresponding suction areas of the transfer roll. Thus, a high suction is provided at the nip A and a low suction is effective throughout the remaining portion of the suction area of said transfer roll. As shown in the drawing the total suction area of the transfer roll is preferably of greater extent than the distance between the nips A and B in order to have it effective beyond said nips.

The paper carried with the forming wire 5 after leaving the primary suction couch roll 6 has preferably been substantially dried, and when the sheet reaches the nip A the high suction area of the transfer roll 29 will suck the paper at the nip A onto the top felt 27 so that the sheet will move along with this top felt. The paper and top felt now reach the influence of the low suction area of transfer roll 29 that will hold the paper against the top felt 27 throughout the low suction area or until two plies meet the bottom felt 28 at the nip B and cover the paper. From this location the paper will be maintained between the two felts 27 and 28 in transit to the press roll assembly 15 and 16. The effect of the suction on the paper and felt while spanning the space between the nips A and B is such that there is no pull upon the paper sheet. The paper sheet upon leaving the nip B will be interposed between the two felts to be supported and moved thereby to the first press assembly.

It will, of course, be understood that various details of construction 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.

We claim as our invention:

1. In a paper making machine having a looped forming wire with a first plain roll in the loop of the wire and a suction roll preceding said first roll, a suction transfer roll opposing the first roll to define a first nip, means in said transfer roll providing adjacent high and low suction areas thereon, a second plain roll opposing said transfer roll to define a second nip spaced from said first nip, a pick up felt trained through said first and second nips, a cover felt trained through said second nip, the high suction area of said transfer roll being constructed and arranged to suck a paper sheet from the wire to the pick up felt adjacent said first nip, and the low suction area of said transfer roll extending from said high suction area to the point where said cover felt lies in juxtaposition to said pick up felt, the low suction area being constructed and arranged to support the paper sheet on the pick up felt until engaged by said cover felt.

2. In a paper making machine having a looped forming wire with a first plain roll in the loop of the wire, a suction transfer roll opposing said first roll to define a first nip, means in said transfer roll providing adjacent high and low suction areas thereon, a second plain roll opposing the transfer roll to define a second nip spaced from said first nip, a pick up felt trained through said first and second nips, a cover felt trained through said second nip, the high suction area of said transfer roll being constructed and arranged to suck a paper sheet from the wire to the pick up felt adjacent the first nip, and the low suction area of said transfer roll extending from said high suction area to said second nip, said low

suction area being constructed and arranged to support the paper sheet on said pick up felt until engaged by said cover felt in said second nip.

3. In a paper making machine having a looped forming wire and a first roll in the loop of the wire, a movable frame, a suction transfer roll on said frame, means urging said frame in the direction to engage said suction transfer roll with said first roll, thereby defining a first nip, arms fulcrumed on said frame, a second roll carried by said arms, means yieldably urging said arms to engage said second roll with said transfer roll to define a second nip, a bottom felt trained on said second roll and passing through said second nip, a top felt passing through said first and second nips, and suction means in said transfer roll for sucking the paper sheet on the forming wire onto said top felt at said first nip and supporting said first sheet on said top felt to said second nip.

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