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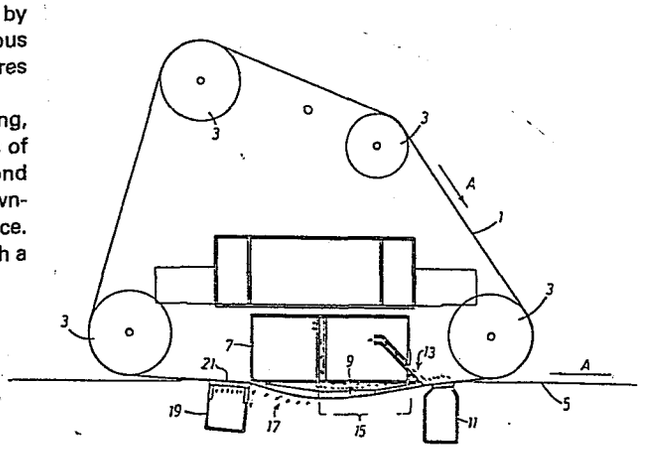
(54) **Improvements in or relating to apparatus for dewatering fibrous suspensions on a paper forming machine.**

(57) An apparatus for dewatering a fibrous suspension comprises a suction housing (7) which has an active surface (9) by means of which water is extracted upwardly from the fibrous suspension which is trapped between top and bottom wires (1, 5).

In order to provide a more efficient means of dewatering, the active surface (9) has a first open area (15) by means of which water is removed upwardly by suction, and a second part (17) downstream of the first, which urges water downwardly. The second part (17) is conveniently a solid surface. The first part of the active surface is preferably curved with a radius which decreases in the downstream direction.



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DESCRIPTION

IMPROVEMENTS IN OR RELATING TO APPARATUS FOR DEWATERING FIBROUS SUSPENSIONS ON A PAPER FORMING MACHINE

The present invention relates to apparatus for dewatering fibrous suspensions on a paper forming machine.

In a known paper forming machine the fibrous suspension passes between top and bottom forming wires and water is extracted from the suspension in an upward direction by use of an auto-slice and a curved inverted suction box which contacts the top wire. The two wires trap the stock over a lead-in-foil and water flows in an upward direction into the auto-slice and afterwards, due to the continuing pressure of the two wires, the dewatering action is continued in an upward direction into the apertures of the inverted suction box.

A transfer suction box is disposed downstream of the inverted suction box on the side of the bottom wire and vacuum applied to the suction box reverses the direction of flow and a downward dewatering action takes place together with the transfer of stock to the bottom wire. The cover has a typical radius of five metres and its contacting surface with the top wire is open to vacuum. The openings in the cover are in the form of slots or drilled holes. The arrangement is such as to produce upward dewatering throughout its whole length.

Stock dewatering using the existing arrangement requires vacuum to be applied to the cover or active surface throughout its whole length and this in turn increases the power required to drive the top wire. It is an aim of the present invention to provide apparatus for dewatering which is more economical

in terms of capital and running costs than the present arrangement and which gives improved retention of the stock on the bottom wire, and which gives a longer suction transfer box cover life.

According to one aspect of the present invention there is provided apparatus for dewatering a fibrous suspension on a paper forming machine comprising a suction housing having an active surface or cover adapted to co-operate with a top wire to urge that wire towards a forming wire, the fibrous suspension being trapped between the top wire and the forming wire, and the cover having a first open area by means of which water is removed upwardly and a second part downstream of the first open area which urges water downwardly.

The first open area comprises a plurality of slots or foils defining slots or a plurality of drilled holes whilst the second part is preferably solid. The open area in the first part of the cover may be reduced in the downstream direction

The solid part of the cover will not permit any dewatering to take place through the cover and, consequently, the pressure of the two wires will force the dewatering action to reverse its direction and go downwards.

According to another aspect of the present invention there is provided a method of dewatering a fibrous suspension on a paper forming machine in which a fibrous suspension trapped between a top wire and a bottom forming wire is moved past an active surface or cover of a suction housing with the top wire contacting the cover for the purpose of removing water from the fibrous suspension, wherein the water is extracted in an upward direction as the fibrous suspension moves past a first open area of the cover, and wherein the

water is directed downwardly as the fibrous suspension moves past a second part of the cover disposed downstream of the first area.

The present invention will now be described further, by way of example only, with reference to the accompanying drawing which is a diagrammatic end view of dewatering apparatus on a paper forming machine.

The machine comprises an endless top-wire 1 which is entrained around rolls 3. Dewatering apparatus in the form of a curved inverted vacuum box having a suction housing 7 is disposed within the top-wire 1 and has an active surface or cover 9 which co-operates with the top-wire 1. The cover 9 urges the top-wire 1 towards a forming wire 5. The fibrous suspension is trapped between the top-wire 1 and the forming wire 5.

The wires 1, 5 move in the direction indicated by arrows A. The forming wire 5 passes over a lead-in-foil 11 which urges water upwardly. An auto-slice 13 immediately downstream of the lead-in-foil removes a proportion of the water in the upward direction. A further portion of the water is removed upwardly by a first part of the cover 9 which has an open area and to which suction is applied from the suction housing. The open area extends over the region shown at 15 and is formed by a plurality of foils defining slots or by drilled holes. The open area may have a compound curvature with a radius which decreases in the downstream direction in order to generate a progressively higher dewatering pressure.

A second part of the cover, generally indicated at 17, is solid. Thus, no dewatering can take place through the cover in this part and, consequently, the pressure of the two wires will force the dewatering action to reverse its direction and go downwards.

Thus, downward dewatering will start before a transverse suction box 19 disposed downstream of the inverted vacuum box 7. The water, dewatered due to the downward action, will be doctored away from the bottom wire 5 by the leading edge of the transfer suction box and through the open area of the transfer suction box cover 21.

The dewatering apparatus of the present invention has the following advantages:-

The downward dewatering of the second part of the curved inverted vacuum box will drain downwardly due to gravity, and will not require any vacuum assistance (as is presently required). Thus, a saving is achieved on Capital and Running costs in respect of:-

the vacuum pump and its installation,

an upward stainless steel compartment with its inlet and discharge equipment is no longer necessary,

and the running cost of energy required to maintain VACUUM.

Due to not having VACUUM on the second part of the shoe, the power required to drive the top wire is reduced and while presently the last part of the vacuum box can have a tendency to plug due to the low flow of water in it, the new solid cover will not plug.

The retention of the Bel Bond will improve. The water, which goes downward, passes through the formed sheet and the bottom wire, and will be of lower consistency than the water presently drained upwards.

The water coming down from the second part of the vacuum box will lubricate the transfer box cover and contribute to a longer suction transfer box cover life.

CLAIMS

1. Apparatus for dewatering a fibrous suspension on a paper forming machine comprising a suction housing (7) having an active surface or cover (9) adapted to co-operate with a top wire (1) to urge that wire towards a forming wire (5), the fibrous suspension being trapped between the top wire and the forming wire, characterised in that the cover (9) has a first open area (15) by means of which water is removed upwardly, and a second part (17) downstream of the first open area which urges water downwardly.

2. Apparatus as claimed in claim 1, in which the first open area (15) comprises a plurality of slots, or foils defining slots, or a plurality of drilled holes.

3. Apparatus as claimed in claims 1 or 2 in which the second part (17) is solid.

4. Apparatus as claimed in any of claims 1, 2 or 3 in which the open area in the first part of the cover is reduced in area in the downstream direction.

5. Apparatus as claimed in any preceding claim in which the open area has a compound curvature with a radius which decreases in the downstream direction.

6. Apparatus as claimed in any preceding claim further comprising a lead-in-foil (11) located upstream of the suction housing cover (9) and adapted to engage the forming wire (5), and a transfer suction box (19) downstream of the suction housing cover (9) and adapted to engage the forming wire (5).

7. Apparatus as claimed in claim 6 in which the lead-in-foil (11) has a solid surface to direct

water upwardly, and the transfer suction box (19) has an open area with applied suction to draw the fibrous suspension onto the forming wire (5).

8. A method of dewatering a fibrous suspension on a paper forming machine in which a fibrous suspension trapped between a top wire (1) and a bottom forming wire (5) is moved past an active surface or cover (9) of a suction housing with the top wire (1) contacting the cover for the purpose of removing water from the fibrous suspension, characterised in that the water is extracted in an upward direction as the fibrous suspension moves past a first open area (15) of the cover (9) and that the water is directed downwardly as the fibrous suspension moves past a second part (17) of the cover disposed downstream of the first area (15).

9. A method as claimed in claim 8 in which pressure is applied to the fibrous suspension as it passes over the active surface (9) and in which the pressure increases in the downstream direction over the first open area of the active surface in proportion to the radius of the active surface.

10. A method as claimed in claim 8 or 9 in which water is urged upwardly upstream of the cover (9) by contacting the bottom forming wire (5) with a solid lead-in-foil (11), and in which further water is extracted downwardly downstream of the cover (9) by passing the bottom forming wire (5) over a transfer suction box cover (21).

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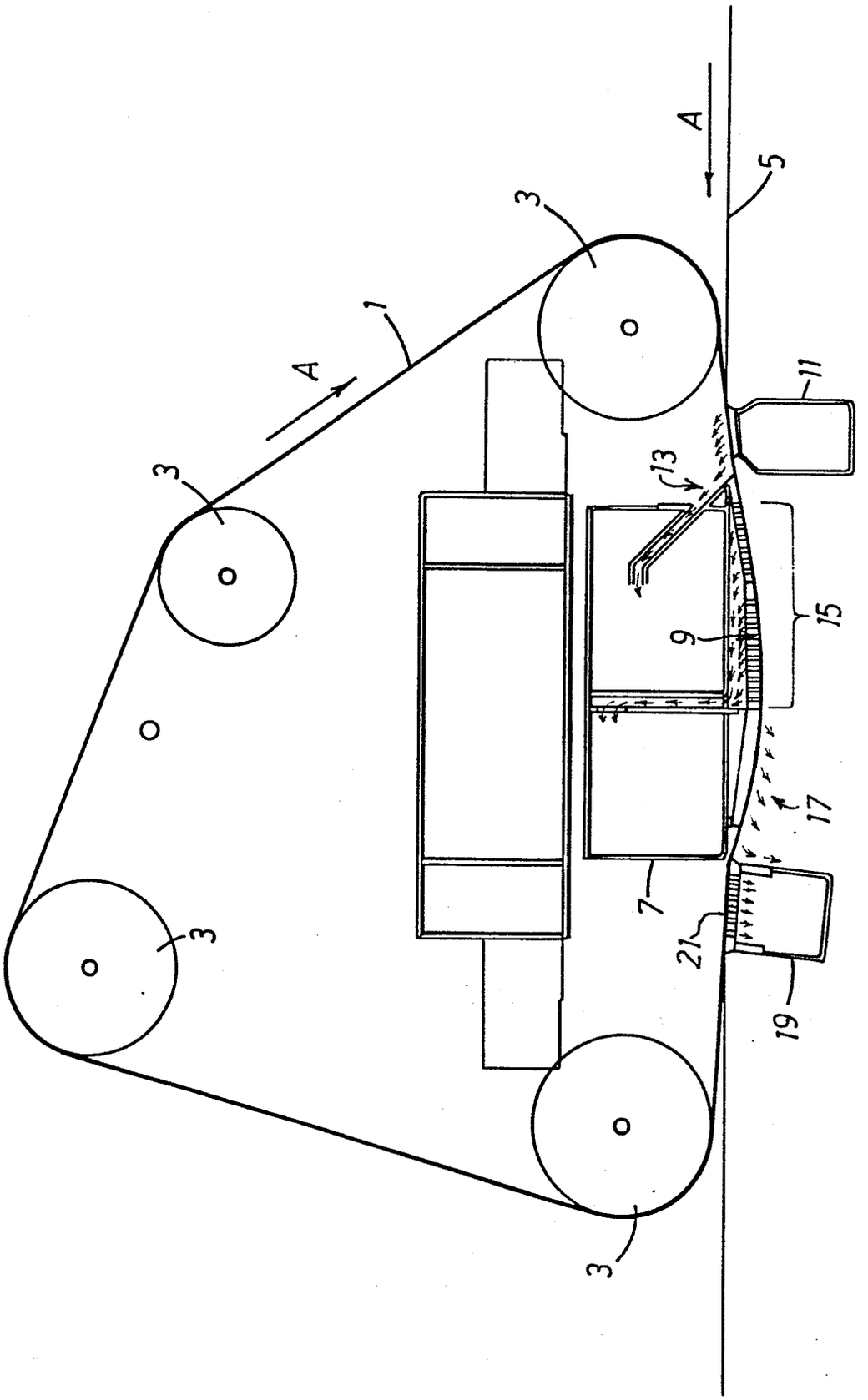

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Application number

EP 84 30 1199

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Y	FR-A-2 388 936 (VALMET OY) * Page 5, line 17 - page 6, line 16; page 8, line 1 - page 10, line 14 *	1-3,8	D 21 F 1/48 D 21 F 3/00
A		5,9	

Y	FR-A-2 350 422 (AUSTRALIAN PAPER) * Page 4, line 5 - page 7, line 11 *	1-3,8	
A		5-7,9, 10	

A	FR-A-2 289 671 (VALMET OY) * Page 4, line 3 - page 5, line 36 *	5,9	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
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P,A	DE-A-3 315 023 (VALMET OY) * Page 9, line 17 - page 11, line 6; page 12, lines 16-31; page 14, line 1 - page 15, line 15 *	2,5,9	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29-06-1984	DE RIJCK F.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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