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Multi-cylinder dryer for paper machine with supported draw of web.

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Description

The invention concerns a multi-cylinder dryer for a paper machine, according to the preamble of claim 1.

As a rule, the prior-art multi-cylinder dryers for paper machines comprise two lines of steam-heated, large-diameter drying cylinders, said lines being placed one above the other, over which said cylinders the web is guided to run meandering. In the cylinder groups of prior-art multi-cylinder dryers, both single-wire draw and twin-wire draw are used. As a rule, single-wire draw, wherein both the drying wire and the web supported by the wire run meandering from the lower line of cylinders to the upper line and the other way round, is used in the initial part of the drying section, because there the web is of higher moisture and lower strength and by means of single-wire draw a closed draw without open transfers is obtained. Twin-wire groups, wherein the web has free draws, unsupported by the wire, between the lines of cylinders, are, as a rule, used in the final end of the drying section, where the web is sufficiently strong so that the free draws of the web and the fluttering occurring therein do not cause excessive breaks of the web. In the case of single-wire draw, on the cylinders, most commonly lower cylinders, which are placed inside the wire loop, the drying wire is in direct contact with the cylinder faces, and the web is thereby outside the wire, which results in lowering of the drying capacity. This is why, when single-wire draw is employed, several cylinders must be added to the multi-cylinder dryer.

The present invention relates to such prior-art dryers in which a particular single-wire draw is used wherein the cylinders in each drying-wire group are placed outside their wire loop so that on all the drying cylinders in a wire group the web is pressed between the face of the drying cylinder and the drying wire or felt. In respect of these dryers, reference is made to the US Patents Nos. 796,601, 4,483,083, 4,677,762, and to the applicant's FI Patent 53,333 (corresponding US Patent No. 3,868,780).

The object of the present invention is further development of the drying section described in the applicant's said FI Pat. 53,333 (corresp. US Pat. 3,868,780), in particular in its Fig. 9, so that the advantages obtained by means of said prior-art dryer are retained, but the drawbacks occurring therein are avoided. In the drying section in accordance with Fig. 9 in FI Pat. 53,333, the cylinders are placed in vertical single-wire groups placed one after the other. Some of the transfers between groups are shown as open or free draws while some are shown as closed draws. In the present-day high-speed paper machines, said free draws cause breaks, and therein the drying tensions tend to be relaxed, causing detrimental shrinkage of the paper web.

For example, in said US Patent 4,677,762, at the wire transfers between vertical cylinder stacks provided with single-wire draw, long dry suction boxes are used, by means of which attempts are made to keep the web in contact with the face of the drying wire so that it should not be detached from the wire and that the drying tensions should not be relaxed into stretching. In order to prevent stretching of the web, it is necessary to use relatively extensive levels of negative pressure, which has the consequence that the faces of the drying wires rub against the suction boxes, which causes in particular detrimental wear of the wires.

The object of the present invention is to avoid the drawbacks that came out above and to provide such a multi-cylinder dryer similar to that defined above in which a closed draw supported by means of negative pressure is obtained for the web, whereby it is meant that the web is all the time supported by the wire and most of the time supported by the wire and the cylinder face and, when the web is outside the cylinders, it is substantially all the time, also on the transfers between lines of cylinders, supported by a suction face.

A further object of the present invention is to provide a multi-cylinder dryer whose length is substantially shorter than in the case of normal dryers that comprise two lines of cylinders placed one above the other, whereby it is possible to lower the cost of construction of the paper machine hall and the related supplementary costs substantially.

A further object of the invention is to provide a drying section wherein the removal of broke is relatively free of problems.

A further object of the invention is to provide a multi-cylinder dryer wherein, in the subsequent wire groups, the web face placed in contact with the drying cylinders is exchanged, whereby the drying process is intensified and the web quality is improved.

Another object of the present invention is to provide a multi-cylinder dryer wherein the threading of the leading end of the web is facilitated so that, in the drying section, threading ropes with their control devices are not necessarily needed at all.

In view of achieving the objectives stated above and those that will come out later, the invention is mainly characterized by the features in the characterizing clause of claim 1.

In the multi-cylinder dryer in accordance with the present invention, the web can be supported better than in corresponding prior-art dryers, as the transfer of the web between the cylinder stacks takes place by means of too transfer-suction rolls...
of relatively large diameter. In such a case, the draws of the web and the wire that are free, with no support by suction effect, can be made so short that the drying tensions of the web do not have time to be relaxed to a detrimental extent to be extended. In practice, the length of said draws, which are not supported by a suction face but which are supported by the wire, is of an order of 500 mm only.

When the invention is applied, one suction roll is also used between the cylinders placed one above the other or side by side in the same stack. In such a case, it is possible to use various solutions of suction rolls known in prior art, such as normal suction rolls provided with suction chambers and perforated mantles; or suction- and blow-box constructions similar to those described, e.g., in the applicant's FI Patent Applications 881106, 881105, 874191, 873812, and 862413 as well as suction-roller constructions.

The two transfer-suction rolls used in the transfers between wire groups in accordance with the invention may have suction zones of different levels of negative pressure.

Said transfer-suction rolls are most appropriately rolls of equal diameters, but it is also possible to use rolls of different sizes.

In said transfer-suction rolls, and so also in the suction rolls between adjoining cylinders, it is possible to use particular suction zones at the proximity of one of their ends, by means of which said zones the threading of the web is carried out even without a system of threading ropes. In respect of the details of these constructions, reference is made to the applicant's FI Pat. Appl. No. 862413.

In a preferred embodiment of the invention, the drying cylinders in different wire groups are placed in vertical stacks placed side by side so that in each stack there are, as a rule, three or more, in special cases two, drying cylinders placed one above the other. In this solution, when the suction-supported closed draw of the drying wires and of the web supported by them, in accordance with the invention, is used between cylinder stacks and wire groups, the length of the drying section can be reduced further even to half length.

By using a drying section in accordance with the invention, the side of the web to be dried that is placed against the drying cylinders can be exchanged in subsequent wire groups, whereby the web quality is improved.

WO-A-8 804 206 discloses a multi-cylinder dryer for a paper machine according to the preambles of claim 1. In this known dryer the drying cylinders of the various groups are placed in horizontal rows and during the transfer of the web from the transfer-suction roll 3A to the neat transfer-suction roll 7A the drying wires have a consid-

erable long parallel run, along which the web rests between the wires and no pressure difference affects the web. The drying wire of the preceding group does not have a wrapping sector over the transfer-section roll of the next group.

In the following, the invention will be described in detail with reference to some exemplifying embodiments of the invention illustrated in the figures in the drawing, the invention being by no means strictly confined to the details of said embodiments.

Figure 1 is a schematic side view of a part of a dryer in accordance with the invention.

Figure 2 is a schematic side view of the overall solution of a preferred dryer in accordance with the invention.

Fig. 1 shows three subsequent wire groups 100,200 and 300 in a drying section, comprising vertical stacks consisting of three steam-heated drying cylinders 10,20,30 placed one above the other, as well as drying wires 11,21 and 31 in each wire group. The inlet of the web W in the first group 100 is denoted with the reference W\text{in} and its outlet out of the last group 300 with the reference W\text{out}. Before the first group 100 there may be similar single-wire groups or other groups of drying cylinders, and after the last group 300 there may be similar or different wire groups, as comes out more closely from Fig. 2.

As is shown in Fig. 1, the wire groups 100,200 and 300 are provided with single-wire draw, so that the drying cylinders 10,20,30 are placed outside the loops of their wires 11,21,31. The web W to be dried is passed over the cylinders 10,20,30 so that the drying wire 11,21,31 presses the web W directly into direct contact with the hot cylinder faces 10°,20°,30°. Between the cylinders 10,20,30 in the different subsequent stacks there are suction rolls 13,23,33, which are provided with suction zones 13a,23a,33a, which keep the web W efficiently on the face of the drying wire 11,21,31 while the web W is thereat at the side of the outside curve. The suction rolls 13a,23a,33a and the drying cylinders 10,20,30 are placed in such a way that the web W has a maximally large covering sector on the drying cylinders 10,20,30. This covering sector is preferably always larger than 180° and as a rule about 200°...280°.

In Fig. 1, inside each wire loop 11,21,31, both at the inlet side and at the outlet side of the web W, there are transfer-suction rolls, whose diameter is large enough so that the space between the cylinder stacks becomes bridged-over. Thus, inside the wire 11 of the first wire group 100, there are transfer-suction rolls 12 and 14 provided with suction zones 12a and 14a. Inside the loop of the wire 21 of the second wire group 200, at the inlet side there is a transfer-suction roll 22 provided with a suction zone 22a, and at the outlet side a transfe-
suction roll 24 provided with a suction zone 24a. In a corresponding way, inside the loop of the wire 31 of the third wire group 300, at the inlet side there is a transfer-suction roll 32 provided with a suction zone 32a, and at the outlet side a transfer-suction roll 34 provided with a suction chamber 34b. At the transfer point between the wire groups, the transfer-suction rolls are arranged at the proximity of each other at short gaps G of security from the adjoining drying cylinders so that the web W has as short draws L₁, L₂, L₃ as possible that are not supported by suction faces. Between adjoining transfer-suction rolls, there is a small gap C₀ or a transfer nip. On a little sector s, the wires are placed one above the other on the suction rolls 22, 32, and thereat, by the effect of the negative pressure in the suction zones 22a, 32a, the web is transferred from the wire 11, 21 to the next wire group 21, 31.

The magnitude of said covering sector s is arranged adjustable by regulating the position of the lead roll 15a. In connection with the threading, it is preferable to use a reasonably large covering sector s, but after the run of the web has been stabilized, it is advantageous to reduce the sector s to a very small angle, down to a line contact.

By arranging the lead rolls 15a adjustable it is also possible to accomplish the advantageous property that a free gap is opened between subsequent transfer-suction rolls, through which said gap the paper web Wₐ passing to broke can be removed.

As is shown in Fig. 1, the drying wires 11, 21, 31 run in the gaps V between adjoining cylinder stacks to the pairs of transfer-suction rolls 14, 22, 24, 32 in subsequent wire groups in opposite directions. In the event of breaks, through said gaps V, the paper web passing to broke can be removed in the directions indicated by the arrows Wₐ, in the open gaps directly into the pulper or broke conveyors placed underneath and in those gaps wherein the pairs of transfer-suction rolls 14, 22 are placed underneath, through the gap between said transfer-suction rolls as the outer wire 11 is resilient.

Fig. 2 illustrates the overall geometry of a drying section in accordance with the invention. The paper web W is passed from the press section (not shown) of the paper machine onto the first wire 1, which is guided by guide rolls 5. The pre-wire group 101 is lower than normal and comprises only two drying cylinders O one above the other. The web W₀ is passed onto the drying wire 1 guided by the guide roll 5, to which said wire 1 the web is made to adhere by means of the suction of the suction box 6, whereupon the web W is passed across the suction zone 3a of the suction roll 3 onto the first drying cylinder O, which is placed outside the wire loop. Hereupon the web W is passed around the suction zone 3a of the suction roll 3 onto the second drying cylinder O, and from there further onto the suction zone 4a of the transfer-suction roll 4, where it is delivered onto the second wire 11 on the suction zone 12a of the transfer-suction roll 12, wherein after the construction is similar to that described in Fig. 1 until the third wire group 300 proper.

After the third wire group 300, there follows a particular fourth wire group 400, which has a long wire loop 41 guided by guide rolls 45. The wire group 400 comprises four cylinder stacks, of which there are three drying cylinders 40a in the first cylinder stack, in the second *stack* there is only one cylinder 40b, in whose area the runs of the wire 41 and of the web W are turned downwards while running over the cylinders 40c in the third stack. The third and the fourth stack have three cylinders 40c and 40d each, and between said stacks there is a suction roll 42a. In the other respects the construction is similar to that described above and comprises a first transfer-suction roll 42 and the transfer-suction rolls 43 placed between the cylinders, provided with suction zones 43a.

After the wide wire group 400, the web W, guided by the suction zone 44a of its last transfer-suction roll 44, is transferred onto the suction zone 52a of the first transfer-suction roll 52 of the fifth wire group 500. The fifth wire group 500 comprises three drying cylinders 50 placed one above the other and, between them, suction rolls 53, which are provided with suction zones.

After the fifth wire group 500 the web W is transferred on the suction zone 54a of the suction roll 54 over the suction zone 62a of the transfer-suction roll 62 of the sixth wire group 600 onto the first drying cylinder 60a in the sixth group 600, the number of said drying cylinders being three, placed in a stack one above the other. After this, in the sixth wire group 600, there is a single drying cylinder 60b, in whose area the runs of the wire 61 and of the web W turn downwards onto a cylinder stack which comprises three cylinders 60c placed one above the other. After the latter stack, the web W is transferred over the suction roll 62a onto the last cylinder stack 60d and from there further, in the direction of the arrow Wₐ out, to a reel-up, machine calender, or equivalent (not shown).

Referring to Fig. 1, it should be stated that the diameters of the transfer-suction rolls 14, 22, 24, 32 are dimensioned large enough so that the space between the cylinder stacks can be bridged-over so that the gaps L₁, L₂, L₃ of the web W, unsupported by a suction face, can be minimized. When the diameters of the drying cylinders are, as a rule, within a range of 1500...3000 mm, the diameters of
the transfer-suction rolls are within a range of 500...2500 mm, whereas the upper and lower limits of said ranges substantially correspond to each other. The shortest gap $C_2$ between transfer-suction rolls is, as a rule, within a range of 0...500 mm, most appropriately within a range of 50...100 mm. The above means that between the transfer-suction rolls 14/22 and 24/32 there may also be a transfer nip, which is, however, as a rule, not the most advantageous embodiment of the invention, e.g., in view of removal of broke.

The shortest distances $G$ of the transfer-suction rolls 14,22;24,32 from the adjoining drying cylinders 10,20;20,30 are, as a rule, within a range of 0...800 mm, most appropriately within a range of 60...200 mm. As a rule, it is preferable to leave a certain security gap $G$, of an order of, e.g., 100 mm, between the transfer-suction rolls and the drying cylinders.

As a typical dimensioning of the drying section in accordance with the invention, the following example is given; length $P$ of a drying section of the sort illustrated in Fig. 2 is $P = 34$ m and height $K = 9$ m. The diameters of the drying cylinders are 1800 mm, the diameters of the transfer-suction rolls are 1500 mm, and the diameters of the suction rolls 13...63 between the drying cylinders are 1000 mm.

The diameters of the pairs of transfer-suction rolls 14/20;24,32 do not have to be equal as compared with each other, and the rolls in said pairs have most appropriately a certain difference in height, as comes out from Figs. 1 and 2.

Between the transfer-suction rolls, it is possible to use various devices, such as the blow devices described in the applicant’s earlier patents, by means of which the support contact between the drying wire and the web is maintained sufficiently good in the transfer areas $L_1,L_2,L_3$.

Claims

1. Multi-cylinder dryer for a paper machine, comprising several single wire draw groups (100...600) placed one after the other, of which said groups in at least two subsequent groups the web (W) is passed from one drying cylinder onto another drying cylinder by means of single-wire draw so that the drying cylinders (0, 10, 20, 30, 40, 50, 60) in the single-wire draw groups are placed outside the loops of their drying wires (1, 11, 21, 31, 41, 51, 61) when the web (W) is passed from one cylinder onto the next one over suction rolls (3, 13, 23, 33, 43, 53, 63) while supported by the wire, and on the drying cylinders of the single-wire groups so that the web (W) enters into direct contact with the heated face of the drying cylinder while pressed by the drying wire over a considerably large sector, whereby the web (W) is passed as a supported draw from one single-wire group to the next single-wire group by using two transfer-suction rolls (4, 12, 14, 22, 24, 32, 34, 42, 44, 52), whereof the first transfer-suction roll (14) is placed inside the loop of the drying wire (11) of the previous single-wire draw group (100) and whereof the second transfer-suction roll (22) is placed in the proximity of the first transfer-suction roll (14) inside the loop of the drying wire (21) of the next single-wire draw group (200) in the proximity of the first drying cylinder (20) in the next group, seen in the direction of running of the web (W), the transfer of the web (W) from the previous wire group (100) to the next wire group (200) occurring essentially continuously supported by a drying wire (11), whereby substantially over the entire transfer distance (L2) from the previous wire group onto the next one, the web (W) is affected by a pressure difference, most preferably a negative pressure affecting from the drying wire side, adhering it to the drying wire, whereby the first transfer-suction roll (14) is located in the proximity of the last cylinder (10) of the previous group, over which first transfer-suction roll the web (W) and the drying wire (11) of the previous wire group (100) run and whereby the web is transferred from the wire of the previous wire group onto the wire of the next wire group by the transfer effect of the suction zone of the second transfer-suction roll (22), on which the wires (11, 21) of the previous and next wire groups have mutual coverings, characterized in that

- the drying cylinders of the single-wire draw groups are stacked one above the other,
- a guide roll (15a) guiding the drying wire (11) of the previous group after the transfer point of the drying wire (11) of the previous group from which the web is transferred onto the drying wire (21) of the next wire group is adjustable so that the magnitude of said mutual covering can be adjusted so as to define a small sector (s) or linear contact.

2. Multi-cylinder dryer as claimed in claim 1, characterized in that when the diameters of the drying cylinders (10, 20, 30, 40, 50, 60) are within a range of 1500 mm to 3000 mm, the diameters of the transfer-suction rolls (4, 12, 14, 22, 24, 32, 34, 42, 44, 52) are within a range of 500 mm to 2500 mm.
3. Multi-cylinder dryer as claimed in claim 1 or 2, characterized in that the shortest distance (Co) between said first and second transfer-suction rolls (4, 12, 14, 22, 24, 32, 34, 42, 44, 52) placed in the proximity of each other is essentially smaller than the diameter of the transfer-suction rolls and within a range of 0...500 mm, most preferably within a range of 50...100 mm.

4. Multi-cylinder dryer as claimed in any of the claims 1 to 3, characterized in that, in the direction of running of the web (W), the shortest distance (G) between the last cylinder (10) in the previous wire group and the first transfer-suction roll (14) placed at the proximity of said cylinder is within a range of 0...800 mm, most appropriately within a range of 60...200 mm, and that, in the direction of running of the web (W), the shortest distance between the first cylinder (20) in the next wire group and the second transfer-suction roll (22) placed at the proximity of said cylinder is within a range of 0...800 mm, most appropriately within a range of 60...200 mm.

5. Multi-cylinder dryer as claimed in any of the claims 1 to 4, characterized in that on the first transfer-suction roll the covering sector of the paper and the first wire is essentially smaller than the corresponding covering sector of the second wire and the paper on the second transfer-suction roll.

6. Multi-cylinder dryer as claimed in any of the claims 1 to 5, characterized in that both on the suction-transfer rolls and on the suction rolls between the drying cylinders, substantially on all of the sector around which the drying wire and the web that remains outside said wire circulate, there are suction zones (13a, 23a, 33a ... 62a).

Patentansprüche

1. Mehrzylindertrockner für eine Papiermaschine, mit mehreren nacheinander angeordneten Einzelsiebzeugpartien (100 ... 600), wobei die Papierbahn (W) in zumindest zwei aufeinanderfolgenden Partien mittels Einzelsiebzeug von einem Trockenzyinder derart auf einen anderen Trockenzyinder geleitet wird, daß die Trockenzyinder (0, 10, 20, 30, 40, 50, 60) in den Einzelsiebzeugpartien außerhalb der Schleifen ihrer Trockensiebe (1, 11, 21, 31, 41, 51, 61) angeordnet sind, wenn die Papierbahn (W) von einem Zylinder über saugwalzen (3, 13, 23, 33, 43, 53, 63) auf den nächsten geleitet wird, während sie mit Hilfe des Siebs unterstützt wird, und auf den Trockenzyinder der Einzel siebpartien derart läuft, daß die Papierbahn (W) in direkte Berührung mit der erhitzenen Fläche des Trockenzyinders tritt, während sie mittels dem Trockensieb über einen außerordentlich großen Sektor angepreßt wird, wo durch die Papierbahn (W) als unterstützter Zug dadurch von einer Einzelsiebpartie zur nächste n Einzelsiebpartie geführt wird, daß zwei Transfersaugwalzen (4, 12, 14, 22, 24, 32, 34, 42, 44, 52) verwendet werden, wobei die erste Transfersaugwalze (14) innerhalb der Schleife des Trockenzyinders (11) der vorherigen Einzel siebzeugpartie (100) angeordnet ist und die zweite Transfersaugwalze (22) in geringem Abstand zur ersten Transfersaugwalze (14) auf der Innenseite der Schleife des Trockenzyinders (21) der nächsten Einzelsiebzeugpartie (200) in geringem Abstand zum ersten Trockenzyinder (20) in der, in Laufrichtung der Papierbahn (W) nächsten Partie angeordnet ist, wobei der Transfer der Papierbahn (W) von der vorherigen Siebpartie (100) zur nächsten Siebpartie (200) von einem Trockensieb (11) unterstützt im wesentlichen unterbrochen geschieht, wobei auf die Papierbahn (W), im wesentlichen über den gesamten Transferabstand (L2), von der vorherigen Siebpartie auf die nächste eine Druckdifferenz, insbesondere ein Unterdruck, einwirkt, welcher diese, von der Trockensiebseite aus wirkend, an das Trockensieb anhaft ten läßt, wobei die erste Transfersaugwalze (14) in geringem Abstand zum letzten Zylinder (10) der vorherigen Partie angeordnet ist, wobei die Papierbahn (W) und das Trockensieb (11) der vorherigen Siebpartie (100) über die erste Transfersaugwalze laufen und die Papierbahn von dem Sieb der vorherigen Siebpartie durch die Transferwirkung der Saugzone der zweiten Transfersaugwalze (22), auf der die siebe (11, 21) der vorherigen und nächsten Siebpartien wechselseitig Überdeckungen aufweisen, auf das Sieb der nächsten Siebpartie transferiert wird, dadurch gekennzeichnet, daß

- die Trockenzyinder der Einzelsiebzeugpartien übereinander angeordnet sind,
- die einen Trockensieb (11) der vorherigen Partie führende Führungswalze (15a) nach dem Transferpunkt des Trockenzyinders (11) der vorherigen Partie, von der die Papierbahn auf das Trockensieb (21) der nächsten Siebpartie transferiert wird, derart einstellbar ist, daß die Größenordnung der wechselseitigen Überdeckung eingestellt werden kann, so daß ein kleiner Sektor (s) oder eine lineare Berührung
festgelegt ist.

2. Mehrzylindertrockner nach Anspruch 1, dadurch gekennzeichnet, daß, wenn die Durchmesser der Trockenzyllinder (10, 20, 30, 40, 50, 60) innerhalb eines Bereiches von 1500 mm bis 3000 mm liegen, die Durchmesser der Transfersaugwalzen (4, 12, 14, 22, 24, 32, 34, 42, 44, 52) innerhalb eines Bereiches von 500 mm bis 2500 mm liegen.

3. Mehrzylindertrockner nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der kürzeste Abstand (Co) zwischen den zueinander in geringe Abstand angeordneten ersten und zweiten Transfersaugwalzen (4, 12, 14, 22, 24, 32, 34, 42, 44, 52) wesentlich geringer als der Durchmesser der Transfersaugwalzen ist und innerhalb eines Bereiches von 0 ... 500 mm, insbesondere innerhalb eines Bereiches von 50 ... 100 mm, liegt.

4. Mehrzylindertrockner nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß in Laufrichtung der Papierbahn (W) der kürzeste Abstand (G) zwischen dem letzten Zylinder (10) der vorherigen Siebpartie und der in geringem Abstand zum Zylinder angeordneten ersten Transfersaugwalze (14) innerhalb eines Bereiches von 0 ... 800 mm und günstiger innerhalb eines Bereiches von 60 ... 200 mm liegt, und daß in Laufrichtung der Papierbahn (W) der kürzeste Abstand zwischen dem ersten Zylinder (20) in der nächsten Siebpartie und der in geringem Abstand zum Zylinder angeordneten zweiten Transfersaugwalze (22) innerhalb eines Bereiches von 0 ... 800 mm und insbesondere innerhalb eines Bereiches von 60 ... 200 mm liegt.

5. Mehrzylindertrockner nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß auf der ersten Transfersaugwalze der Überdeckungsschnitt des Papiers und des ersten Siebes wesentlich geringer als der entsprechende Überdeckungsschnitt des zweiten Siebes und des Papiers auf der zweiten Transfersaugwalze ist.

6. Mehrzylindertrockner nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß sowohl auf den Saugtransferwalzen als auch auf den Saugwalzen zwischen den Trockenzyllindern, und im wesentlichen auf dem ganzen Sektor, um welchen das Trockenseib und die außerhalb des Siebes verbleibende Papierbahn laufen, Saugzonen (13a, 23a, 33a ... 62a) vorhanden sind.

Revendications

1. Sécheur multi-cylindre pour une machine à papier, comprenant plusieurs groupes d’entraînement à toile métallique unique (100...600) placés les uns après les autres, groupes dans lesquels la nappe (W) est transférée, dans au moins deux groupes successifs, d’un cylindre sécheur sur un autre cylindre sécheur au moyen d’un entraînement à toile unique de manière que les cylindres sécheurs (0, 10, 20, 30, 40, 50, 60) des groupes à entraînement à toile unique soient placés à l’extérieur des boucles de leurs toiles sécheuses (1, 11, 21, 31, 41, 51, 61) quand la nappe (W) est transférée d’un cylindre sur le suivant en passant sur des rouleaux aspirants (3, 13, 23, 33, 43, 53, 63) tout en étant supportée par la toile, et sur les cylindres sécheurs des groupes à toile unique de manière que la nappe (W) parvienne en contact direct avec la face chauffée des cylindres sécheurs tout en étant pressée par la toile sécheuse sur un secteur très important, la nappe (W) étant transférée par un entraînement supporté d’un groupe à toile unique vers le groupe à toile unique suivant en utilisant deux rouleaux de transfert aspirants (4, 12, 14, 22, 24, 32, 34, 42, 44, 52), le premier rouleau de transfert aspirant (14) étant placé à l’intérieur de la boucle de la toile sécheuse (11) du groupe d’entraînement à toile unique précédent (100) et le second rouleau de transfert aspirant (22) étant placé à proximité du premier rouleau de transfert aspirant (14) à l’intérieur de la boucle de la toile sécheuse (21) du groupe d’entraînement à toile unique suivant (200) et à proximité du premier cylindre sécheur (20) du groupe suivant, vu dans la direction du déplacement de la nappe (W), le transfert de la nappe (W) du groupe précédent (100) vers le groupe suivant (200) ayant lieu sensiblement de façon continue en étant supportée par une toile sécheuse (11), la nappe (W) étant soumise sensiblement sur l’ensemble de la distance de transfert (Lz) entre le groupe précédent et le groupe suivant à une différence de pression, qui est de préférence une pression négative exerçant son effet à partir du côté de la toile sécheuse et faisant adhérer la nappe à la toile sécheuse, le premier rouleau de transfert aspirant (14) étant situé à proximité du dernier cylindre (10) du groupe précédent, premier rouleau de transfert aspirant sur lequel passent la nappe (W) et la toile sécheuse (11) du groupe précédent (100), et la nappe étant transférée de la toile du groupe précédent sur la toile du groupe suivant par l’effet de transfert de la zone aspiran-
te du second rouleau de transfert aspirant (22) sur laquelle les toiles (11, 21) du premier groupe et du groupe suivant se recouvrent mutuellement, caractérisé en ce que
- les cylindres sécheurs des groupes d’entraînement à toile unique sont emplâtres les uns sur les autres,
- un rouleau de guidage (15a) qui guide la toile sécheuse (11) du groupe précédent peut être ajusté après le point de transfert de la toile sécheuse (11) du groupe précédent d’où la nappe est transférée sur la toile sécheuse (21) du groupe suivant de manière que l’amplitude de l’alite zone de recouvrement mutuel puisse être ajustée de façon à définir un petit secteur (s) ou un contact linéaire.

2. Sécheur multi-cylindre selon la revendication 1, caractérisé en ce que lorsque les diamètres des cylindres sécheurs (10, 20, 30, 40, 50, 60) sont compris dans la plage allant de 1500 mm à 3000 mm, les diamètres des rouleaux de transfert aspirants (4, 12, 14, 22, 24, 32, 34, 42, 44, 52) sont compris dans une plage allant de 500 mm à 2500 mm.

3. Sécheur multi-cylindre selon la revendication 1 ou 2, caractérisé en ce que la distance la plus courte (Cw) entre les dis premiers et second rouleaux de transfert aspirants (4, 12, 14, 22, 24, 32, 34, 42, 44, 52) placés à proximité les uns des autres est sensiblement plus petite que le diamètre des rouleaux de transfert aspirants, et située dans une plage allant de 0 à 500 mm, et de préférence dans une plage allant de 50 à 100 mm.

4. Sécheur multi-cylindre selon l’une quelconque des revendications 1 à 3, caractérisé en ce que dans la direction du déplacement de la nappe (W), la distance la plus courte (G) entre le dernier cylindre (10) du groupe précédent et le premier rouleau de transfert aspirant (14) placé à proximité dudit cylindre est située dans la plage allant de 0 à 800 mm, et de préférence de 60 à 200 mm, et en ce que dans la direction du déplacement de la nappe (W), la distance la plus courte entre le premier cylindre (20) du groupe suivant et le second rouleau de transfert aspirant (22) placé à proximité dudit cylindre est comprise dans la plage allant de 0 à 800 mm, et de préférence dans la plage allant de 60 à 200 mm.

5. Sécheur multi-cylindre selon l’une quelconque des revendications 1 à 4, caractérisé en ce que le secteur de recouvrement du papier et de la première toile métallique sur le premier rouleau de transfert aspirant est sensiblement plus petit que le secteur de recouvrement correspondant de la seconde toile métallique et du papier sur le second rouleau de transfert aspirant.

6. Sécheur multi-cylindre selon l’une quelconque des revendications 1 à 5, caractérisé en ce que sont prévues des zones aspirantes (13a, 23a, 33a … 62a) sensiblement sur la totalité du secteur autour duquel circulent la toile sécheuse et la nappe qui reste à l’extérieur de ladite toile, aussi bien sur les rouleaux de transfert aspirants que sur les rouleaux aspirants entre les cylindres sécheurs.