



(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification :
13.01.93 Bulletin 93/02

(51) Int. Cl.⁵ : **D21F 3/02, D21F 3/08**

(21) Application number : **88908065.1**

(22) Date of filing : **23.08.88**

(86) International application number :
PCT/US88/02914

(87) International publication number :
WO 89/02005 09.03.89 Gazette 89/06

(54) **AN APPARATUS AND METHOD FOR REMOVING FLUID FROM A FIBROUS WEB.**

(30) Priority : **27.08.87 US 89887**

(43) Date of publication of application :
18.07.90 Bulletin 90/29

(45) Publication of the grant of the patent :
13.01.93 Bulletin 93/02

(84) Designated Contracting States :
DE FR GB IT SE

(56) References cited :
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EP-A- 0 258 169
DE-A- 2 328 738
DE-C- 575 453
US-A- 3 296 710
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EP 0 377 641 B1

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Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

This invention relates to an apparatus and method for removing fluid from a fibrous web. More particularly, this invention relates to an apparatus and method in which a formed web is subjected for an extended period to increased pressure and temperature such that fluid within the web is removed.

INFORMATION DISCLOSURE STATEMENT

In the papermaking art, as much water as possible is removed from the web in the press section because mechanical removal of fluid at this stage is more economical than subsequent removal of fluid in the drying section of the papermaking machine.

Such a prior art proposal is disclosed in DE-C-575,453 which shows a press member A with a web B extending therearound. A metal band C extends around a nip roll D and sandwiches the web B between the band C and the press member A. The band C continues around the press member and extends through a further nip defined between a further nip roll D and the press member A. A second band F moves contiguously with the metal band C around the press member A such that the band C is sandwiched between the web and the second band F. The web is heated by heating means I and K during passage of the web through the pressing section.

In the aforementioned DE-C-575 453 there is described an apparatus according to the preamble of claim 1. More specifically, DE-C-575 453 teaches the provision of an apparatus for removing fluid from a fibrous web, the apparatus including a press member, a blanket means cooperating with the press member for defining therebetween an elongate pressing section such that the web is pressed between the press member and the blanket means during passage through the pressing section, and heating means disposed adjacent to the press member. A method for removing fluid from a fibrous web according to the preamble of claim 18 is also known from DE-C-575 453.

Difficulties are encountered with an apparatus of the type described in DE-C-575 453 with respect to the application of high pressures to the web. In particular, delamination of the formed web can occur if the web is subjected to high temperatures and high pressures within the pressing section.

EP-A-0 258 169 published on March 2, 1988 falls under Article 54(3) EPC and thus is not relevant to the question of inventive step. In the aforementioned EP-A-0 258 169, a so-called "high temperature pressing apparatus and method" is disclosed in which the paper web is subjected to a press drying operating for

removing most of the water from the fibrous web. The high temperature pressing technique involves the application of high temperatures and pressure to the paper web for an extended period of time. In one embodiment of the high temperature pressing (HTP) process, the web to be dried extends through a press which includes an elongate shoe and a cooperating backing roll. A blanket extends, together with the web, through a pressing section defined between the shoe and the backing roll (or pressing member). The pressing member is inductively, or otherwise, heated such that during passage of the web through the pressing section, fluid within the web is vaporized to force fluid remaining in the liquid phase away from the web.

Because of the very high temperatures employed in the aforementioned HTP process coupled with the extremely high pressures, delamination of the formed web has been experienced. Such delamination occurs primarily as the result of the rapid evolution of vapor within the pressing section with such vapor blowing the web apart as the web exits from the pressing section.

It is a primary objective of the present invention to overcome the aforementioned problems associated with the aforementioned press drying apparatus and techniques and to provide an apparatus and method which contributes significantly to the press drying art.

To achieve this, the apparatus of the invention is characterized by the features claimed in the characterizing portion of claim 1 and the method of the invention is characterized by the features set forth in the characterizing portion of claim 18. According to the invention a pressing shoe urges the blanket means towards the press member such that when the web passes through the pressing section, fluid is removed from the web. The heating means are disposed upstream relative to the pressing section for heating the press member and structured such that when the web passes through the pressing section, the web is subjected for an extended period to increased pressure and temperature so that water vapour generated within the pressing section during passage through the pressing section forces the fluid in the liquid phase away from the web.

Advantageous embodiments of the invention are claimed in the subclaims.

In accordance with an aspect of the present invention there is provided an apparatus for removing fluid from a fibrous web in which the press member defines a pressing surface which is porous.

In a specific embodiment the present invention provides an apparatus for removing fluid from a fibrous web in which the press member includes a first and a second coaxial layer with the second coaxial layer extending around the first layer, the second layer defining a cylindrical pressing surface.

Another feature of the present invention is the

provision of an apparatus for removing fluid from a fibrous web in which the second layer is sintered and has a pore size of at least 2 microns.

Another feature of the present invention is the provision of an apparatus for removing fluid from a fibrous web in which the second layer has a thickness of at least .0127 centimeters (.005 inches).

Another feature of the present invention is the provision of an apparatus for removing fluid from a fibrous web in which the sintered layer is spray-coated onto the first layer which is a backing roll of an extended nip press.

Another embodiment of the present invention provides an apparatus for removing fluid from a fibrous web in which the apparatus includes a fiber metal felt disposed between a press roll and the web such that in operation of the apparatus, the metal felt passes with the web through the press section and in which the metal felt is heated immediately prior to the passage of the felt through the pressing section.

Another feature of the present invention is the provision of an apparatus for removing fluid from a fibrous web in which a cleaning means is provided for grassing a cleaning medium through the metal felt towards a surface of the metal felt contacting the web so that contaminants picked up by the metal felt during operation of the apparatus are ejected from the metal felt.

Another feature of the present invention is the provision of an apparatus for removing fluid from a fibrous web in which the first layer of the press member is vented.

Other features and advantages of the present invention will be apparent to those skilled in the art by consideration of the detailed description contained hereinafter taken in conjunction with the annexed drawings.

In a more specific embodiment of the present invention, the pressing surface is cylindrical and the press member includes a first coaxial layer and a second coaxial layer which extends around the first layer with the second layer defining the cylindrical pressing surface.

The second layer is sintered and has a pore size of at least 2 microns and a thickness of at least .0127 cm (.005 inches). The second layer may be spray-coated onto the external surface of the first layer which may be an extended nip press backing roll.

In an alternative embodiment of the present invention, the apparatus includes a fiber metal felt which is disposed between the press member and the web such that in operation of the apparatus, the metal felt passes with the web through the press section, the metal felt being heated immediately prior to passage through the press section.

In the alternative embodiment of the present invention, the apparatus also includes cleaning means for cleaning the metal felt. The cleaning means in-

cludes means for passing a cleaning medium through the metal felt towards a surface of the metal felt contacting the web so that contaminants picked up by the metal felt during operation of the apparatus are ejected from the metal felt.

In another embodiment of the present invention, the first layer is vented such that fluid entering the porous layer passes through the second layer into the first layer.

In a further embodiment of the present invention, the hot roll includes a first, or inner, solid surface, a second, or outer, layer having a porosity of 20 microns and an intermediate third layer of 100 microns porosity disposed between the first and second layers such that the third layer assists in the ventilation of the roll.

Although the present invention has been described with a certain degree of particularity, it is to be understood by those skilled in the art that the present invention is not limited to the embodiments described in detail hereinafter.

More specifically, although the present invention provides a porous second layer for inhibiting delamination, it will be apparent to those skilled in the art that in the alternative embodiment of the present invention, the provision of the fiber metal felt may be sufficient to inhibit delamination of the formed web without the need of a porous outer layer on the press member.

Additionally, it will be appreciated by those skilled in the art that the second, or outer, layer may not necessarily be a separate layer but may be etched onto the first layer or otherwise provided by mechanically working the surface of the first layer.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side-elevational view of an apparatus for removing fluid from a fibrous web according to the present invention;

Figure 2 is a side-elevational view of a second embodiment of the present invention showing the provision of a first and second layer of the press member;

Figure 3 is a side-elevational view of a third embodiment of the present invention showing a fiber metal felt;

Figure 4 is a side-elevational view of a fourth embodiment of the present invention in which the first layer is vented;

Figure 5 is a sectional view taken on the line 5-5 of figure 4;

Figure 6 is a side-elevational view of a fifth embodiment of the present invention in which the first layer is grooved, and

Figure 7 is a side-elevational view of a sixth embodiment of the present invention including a third intermediate layer.

Similar reference characters refer to similar parts throughout the various embodiments of the present

invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Figure 1 is a side-elevational view of an apparatus generally designated 10 for removing fluid from a fibrous web W. The apparatus 10 includes a press member 12 and a blanket means generally designated 14 which cooperates with the press member 12 for defining therebetween an elongate pressing section generally designed 16 such that the web W is pressed between the press member 12 and the blanket means 14 during passage through the pressing section 16. An elongate means 18 such as an extended nip press shoe, urges the blanket means 14 towards the press member 12 as indicated by the arrow 20 such that when the web W passes through the pressing section 16 fluid is removed from the web W. Heating means generally designated 22 is disposed adjacent to the press member 12 for transferring heat to the web W such that when the web W passes through the press section 16, the web W is subjected for an extended period to increased pressure and temperature so that water vapor generated within the pressing section 16 during passage through the pressing section 16 forces the fluid in the liquid phase away from the web W. The press member 12 defines a pressing surface 24 which is porous for inhibiting delamination of the web W. More specifically, as shown in figure 1, the pressing surface is cylindrical.

Figure 2 is a similar view to that shown in figure 1 but shows a second embodiment of the present invention in which an apparatus 10A for removing fluid from a fibrous web WA includes a press member 12A in which the press member 12A has a first coaxial layer 26 and a second coaxial layer 28 extending around the first layer 26. The second layer 28 defines a cylindrical pressing surface 24A. The second layer 28, as shown in figure 2, may be a sintered layer having a pore size of at least 2 microns. The second layer 28 has a thickness of at least .0127 cm (.005 inches). Such second layer 28 may be applied to the first layer 26 by a spray-coating technique. The second layer 28 in the aforementioned spray-coating technique, is spray-coated onto the external surface 30 of the first layer 26, the first layer 26 being an extended nip press backing roll.

Preferably, the second layer 28 is applied to the first layer 26 by the aforementioned spray-coating technique in which the specification and performance of the resultant second layer 28 is equivalent to the specification and performance of a plate having a pore size of at least 2 microns and a thickness of at least .0127 cm (.005 inches).

Figure 3 is a side-elevational view of a third embodiment of the present invention and shows an apparatus 10B for removing fluid from a fibrous web WB. The apparatus 10B includes a fiber metal felt 32 which

is disposed between a press member 12B and the web WB such that in operation of the apparatus 10B, the metal felt 32 passes with the web WB through the press section 16B. The metal felt 32 is heated as indicated by the heater 22B immediately prior to passage of the metal felt 32 through the press section 16B. The porosity, void volume and heat transfer specification of the metal felt 32 is equivalent to the specification and performance of a sintered plate having a pore size of at least 2 microns and a thickness of at least .0127 cm (.005 inches).

Figure 3 also shows cleaning means generally designated 34 disposed downstream relative to the press member 12B for cleaning the metal felt 32. The cleaning means 34 includes means 36 such as a pump for passing a cleaning medium through the metal felt 32 towards a surface 24B of the metal felt 32 contacting the web WB so that contaminants picked up by the metal felt 32 during operation of the apparatus 10B are ejected from the metal felt 32.

Figure 4 is a side-elevational view of a fourth embodiment of the present invention and shows an apparatus 10C in which the first layer 26C of the press member 12C is vented such that fluid entering the pressing surface 24C passes through the second layer 28C into the first layer 26C. As shown in figures 4 and 5, the first layer 26C is grooved as shown particularly in figure 5 which is a section on the line 5-5 of figure 4. Figure 5 shows a plurality of axially-spaced grooves 38, 39 and 40 defined by the external surface 30C of the first layer 26C.

Figure 6 is a similar view to that shown in figures 4 and 5 but shows a fifth embodiment of the present invention in which the first layer 26D is blind-drilled as indicated by the holes 41, 42 and 43.

In a further embodiment of the present invention as shown in figure 7, the heated roll, or press member, 12E includes a first layer 26E which is solid and an outer, or second, porous layer 28E having a pore size within the range 5-50 microns and preferably of 20 microns. An intermediate third layer 44 is disposed between layers 26E and 28E, the third layer 44 having a pore size within the range 50-100 microns and preferably of 100 microns such that ventilation of the second layer and the web WE is assisted.

In operation of the apparatus 10, as shown in figure 1, the web W is conducted through the press section 16 and heat is applied, for example by induction heating, through the heater 22 such that the press member 12 is heated. Pressure is applied as indicated by the arrow 20 such that the blanket 14 is pressed towards the pressing member 12 thereby exerting pressure on the web W as the web W passes through the pressing section 16. The combination of high pressure and high temperature for an extended period results in fluid from within the fibrous web W being vaporized such that this vapor forces fluid in the liquid phase away from the web W. Although there exists a

tendency for the aforementioned force of such pressurized vapor to cause delamination in the pressed web, the present invention overcomes this problem by the provision of a porous layer 24 on the outer surface of the press member 12 such that the vapor pressure is relieved and the amount of heat transferred through the press member 12 to the web W is reduced thereby inhibiting delamination of the web.

The operation of the embodiment shown in figure 2 is similar to that shown in figure 1, however, figure 2 shows a simple means of applying a porous layer 28 to the external surface of a conventional backing roll of an extended nip press.

In operation of the embodiment shown in figure 3, a fiber metal felt 32 is used to convey thermal energy from the heater 22B towards the pressing section 16B such that the web WB is subjected to heat and pressure during passage through the pressing section 16B. The advantage of the embodiment shown in figure 3 is that the pressing surface which effectively is the surface 24B of the metal felt 32 may be cleaned by means of the cleaning means 34. Also, the metal felt can be replaced more easily than a porous surface roll. Another advantage derived from use of a metal felt is that the press member or roll will run significantly cooler thereby alleviation problems associated with heating a controlled crown type roll.

The operation of the embodiment shown in figures 4, 5, 6 and 7 is similar to that of the embodiment shown in figures 1 and 2, however, the provision of a grooved (or blind-drilled) first layer permits further reduction in the force applied by the vapor in removing fluid in the liquid phase away from the web in the case of the embodiments of figures 4-6. Similarly, with the embodiments of figure 7, the third layer 44 assists in the ventilation of the outer layer 28 and the web WE. Although this may reduce the overall amount of fluid removed from the web, such arrangements avoid the problem of delamination and thus provides a very practical and economic means for press drying a fibrous web.

Claims

1. An apparatus for removing fluid from a fibrous web (W;WA;WB;WC;WD;WE), said apparatus including a press member (12;12A;12B;32;12C;12D;12E),
 - a blanket means (14;14A;14B;14C;14D;14E) cooperating with said press member (12;12A;12B;32;12C;12D;12E) for defining therebetween an elongate pressing section (16;16A;16B;16C;16D;16E) such that the web is pressed between the press member (12;12A;12B;32;12C;12D;12E) and the blanket means (14;14A;14B;14C;14D;14E) during passage through the pressing section (16;16A;16B;16C;16D;16E), and
 - heating means (22;22A;22B;22C;22D;22E) disposed adjacent to said press member (12;12A;12B;32;12C;12D;12E),
 - characterized in that a pressing shoe (18;18A;18B;18C;18D;18E) urges said blanket means (14;14A;14B;14C;14D;14E) towards said press member (12;12A;12B;32;12C;12D;12E) such that when the web (W;WA;WB;WC;WD;WE) passes through said pressing section (16;16A;16B;16C;16D;16E), fluid is removed from the web (W;WA;WB;WC;WD;WE),
 - said heating means (22;22A;22B;22C;22D;22E) are disposed upstream relative to said pressing section (16;16A;16B;16C;16D;16E) for heating said press member (12;12A;12B;32;12C;12D;12E) and structured such that when the web (W;WA;WB;WC;WD;WE) passes through said pressing section (16;16A;16B;16C;16D;16E), the web (W;WA;WB;WC;WD;WE) is subjected for an extended period to increased pressure and temperature so that water vapor generated within said pressing section (16;16A;16B;16C;16D;16E) during passage through said pressing section (16;16A;16B;16C;16D;16E) forces the fluid in the liquid phase away from the web (W;WA;WB;WC;WD;WE),
 - and the press member (12;12A;12B;32;12C;12D;12E) defines a pressing surface (24;24A;24B;24C;24D;24E) which is porous for inhibiting delamination of the web (W;WA;WB;WC;WD;WE).
2. An apparatus as set forth in claim 1, characterized in that said pressing surface (24;24A;24C;24D;24E) is cylindrical.
3. An apparatus as set forth in claim 2, characterized in that said press member (12;12C;12D;12E) further includes:
 - a first coaxial layer (26;26C;26D;26E),
 - a second coaxial layer (28;28C;28D;28E) extending around said first layer (26;26C;26D;26E) said second layer (28;28C;28D;28E) defining said cylindrical pressing surface (24;24A;24C;24D;24E).
4. An apparatus as set forth in claim 3, characterized in that said second layer (28;28C;28D;28E) is sintered.
5. An apparatus as set forth in claim 4, characterized in that said sintered second layer (28;28C;28D;28E) has a pore size of at least 2 microns.
6. An apparatus as set forth in claim 4, characterized in that said second layer (28;28C;28D;28E) has a thickness of at least .0127 centimeters

(.005 inches).

7. An apparatus as set forth in claim 4, characterized in that said second layer (28;28C;28D;28E) is a spray coating on said first layer (26;26C;26D;26E).

8. An apparatus as set forth in claim 4, characterized in that said second layer (28;28C;28D;28E) is spray-coated onto the external surface of said first layer (26;26C;26D;26E) which is an extended nip press backing roll.

9. An apparatus as set forth in claim 7, characterized in that said second layer (28;28C;28D;28E) is applied to said first layer (26;26C;26D;26E) by a spray-coating technique in which the porosity, void volume and heat transfer specification of said resultant second layer is equivalent to the porosity, void volume and heat transfer specification of a plate having a pore size of at least 2-50 microns and a thickness of .0127-.0254 centimeters (.005-.010 inches).

10. An apparatus as set forth in claim 1, characterized in that said press member (12B,32) includes a press roll (12B) and a fiber metal felt (32) disposed between the press roll (12B) and the web (WB) such that in operation of said apparatus, said metal felt (32) passes with said web (WB) through said press section (16B).

11. An apparatus as set forth in claim 10, characterized in that said heating means (22B) heats said metal felt (32) immediately prior to passage through said press section (16B).

12. An apparatus as set forth in claim 11, characterized in that the porosity, void volume and heat transfer specification of said metal felt (32) is equivalent to the specification of a sintered plate having a pore size of 2-50 microns and a thickness of .0127 - .0254 centimeters (.005 - .010 inches).

13. An apparatus as set forth in claim 11, characterized in further including:

cleaning means (34) for cleaning said metal felt (32), said cleaning means (34) including means (36) for passing a cleaning medium through said metal felt (32) towards a surface (24B) of said metal felt (32) contacting the web (WB) so that contaminants picked up by said metal felt (32) during operation of the apparatus are ejected from said metal felt (32).

14. An apparatus as set forth in claim 3 characterized in that said first layer (26C) is vented such that

fluid entering said pressing surface (24C) passes through said second layer (28C) into said first layer (26C).

15. An apparatus as set forth in claim 14, characterized in that said first layer (26C) is grooved.

16. An apparatus as set forth in claim 14, characterized in that said first layer (26C) is blind-drilled.

17. An apparatus as set forth in claim 1, characterized by said press member (12E) further including a first solid inner layer (26E), a second outer layer (28E) extending around said first layer (26E), said second layer (28E) having a pore size of between 5-50 microns, and a third intermediate layer (44) disposed between said first and second layers (26E,28E) respectively, said third layer (44) having a pore size within the range 50-100 microns such that said third layer (44) assists in ventilating said second layer (28E) and the web (WE).

18. A method for removing fluid from a fibrous web (WB), the method including the steps of:

conducting the fibrous web (WB) through an elongate pressing section (16B) defined between a press roll (12B) and a blanket (14B) such that the web (WB) and the blanket (14B) move together through the elongate pressing section (16B),

pressing the web (WB) between the press roll (12B) and the blanket (14B) during passage through the elongate pressing section (16B),

characterized by providing an extended nip pressing shoe (18B) for urging the blanket (14B) towards the press roll (12B), the blanket (14B) being disposed between the web (WB) and the extended nip pressing shoe (18B) in the pressing section (16B),

heating a fiber metal felt (32) extending through the elongate pressing section (16B), the metal felt (32) being heated immediately prior to passage of the metal felt (32) through the pressing section (16B) such that the heat transferred to the web (WB) from the metal felt (32) is sufficient to vaporize a portion of the fluid contained within the web (WB) so that fluid in the liquid phase within the web (WB) is forced by the vapor away from the web, while inhibiting delamination of the web (WB), by a porous pressing surface (24B) defined by the fiber metal felt (32).

Patentansprüche

1. Vorrichtung zum Entfernen von Fluid aus einer Faserbahn (W; WA; WB; WC; WD; WE), wobei

- die Vorrichtung ein Preßteil (12; 12A; 12B, 32; 12C; 12D; 12E) aufweist, eine Tucheinrichtung (14; 14A; 14B; 14C; 14D; 14E), die mit dem Preßteil (12; 12A; 12B, 32; 12C; 12D; 12E) zusammenwirkt, so daß zwischen ihnen eine langgestreckte Preßpartie (16; 16A; 16B; 16C; 16D; 16E) gebildet ist und die Bahn zwischen dem Preßteil (12; 12A; 12B, 32; 12C; 12D; 12E) und der Tucheinrichtung (14; 14A; 14B; 14C; 14D; 14E) während des Durchgangs durch die Preßpartie (16; 16A; 16B; 16C; 16D; 16E) gepreßt wird, und eine Heizeinrichtung (22; 22A; 22B; 22C; 22D; 22E), die an dem Preßteil (12; 12A; 12B, 32; 12C; 12D; 12E) angeordnet ist, dadurch gekennzeichnet, daß ein Preßschuh (18; 18A; 18B; 18C; 18D; 18E) die Tucheinrichtung (14; 14A; 14B; 14C; 14D; 14E) an das Preßteil (12; 12A; 12B, 32; 12C; 12D; 12E) anpreßt, so daß, wenn die Bahn (W; WA; WB; WC; WD; WE) durch die Preßpartie (16; 16A; 16B; 16C; 16D; 16E) hindurchgeht, Fluid aus der Bahn (W; WA; WB; WC; WD; WE) entfernt wird, wobei die Heizeinrichtung (22; 22A; 22B; 22C; 22D; 22E) stromaufwärts der Preßpartie (16; 16A; 16B; 16C; 16D; 16E) angeordnet ist, um das Preßteil (12; 12A; 12B, 32; 12C; 12D; 12E) zu erwärmen, und so ausgebildet ist, daß, wenn die Bahn (W; WA; WB; WC; WD; WE) durch den Preßabschnitt (16; 16A; 16B; 16C; 16D; 16E) hindurchgeht, die Bahn (W; WA; WB; WC; WD; WE) für eine ausgedehnte Zeitspanne erhöhtem Druck und erhöhter Temperatur ausgesetzt ist, so daß Wasserdampf, der innerhalb der Preßpartie (16; 16A; 16B; 16C; 16D; 16E) während des Durchgangs durch die Preßpartie (16; 16A; 16B; 16C; 16D; 16E) erzeugt wird, das Fluid in der flüssigen Phase aus der Bahn (W; WA; WB; WC; WD; WE) hinausdrückt, und wobei das Preßteil (12; 12A; 12B, 32; 12C; 12D; 12E) eine Preßoberfläche (24; 24A; 24B; 24C; 24D; 24E) aufweist, die porös ist, um eine Schichtablösung der Bahn (W; WA; WB; WC; WD; WE) zu verhindern.
2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Preßoberfläche (24; 24A; 24C; 24D; 24E) zylindrisch ist.
 3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß das Preßteil (12; 12C; 12D; 12E) weiter aufweist: eine erste koaxiale Schicht (26; 26C; 26D; 26E), eine zweite koaxiale Schicht (28; 28C; 28D; 28E), welche sich um die erste Schicht (26; 26C; 26D; 26E) erstreckt, wobei die zweite Schicht (28; 28C; 28D; 28E) die zylindrische Preßoberfläche (24; 24A; 24C; 24D; 24E) aufweist.
 4. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die zweite Schicht (28; 28C; 28D; 28E) gesintert ist.
 5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die gesinterte zweite Schicht (28; 28C; 28D; 28E) eine Porengröße von wenigstens 2 Mikrometern hat.
 6. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die zweite Schicht (28; 28C; 28D; 28E) eine Dicke von wenigstens 0,0127 Zentimetern (0.005 Zoll) hat.
 7. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die zweite Schicht (28; 28C; 28D; 28E) ein Spritzüberzug auf der ersten Schicht (26; 26C; 26D; 26E) ist.
 8. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die zweite Schicht (28; 28C; 28D; 28E) als Spritzüberzug auf die äußere Oberfläche der ersten Schicht (26; 26C; 26D; 26E), die eine Anpreßwalze mit ausgedehnter Anpreßzone ist, ist.
 9. Vorrichtung nach Anspruch 7, dadurch gekennzeichnet, daß die zweite Schicht (28; 28C; 28D; 28E) auf die erste Schicht (26; 26C; 26D; 26E) durch eine Spritzüberzugstechnik aufgebracht ist, bei der die Porositäts-, Hohlraum- und Wärmeübertragungsspezifikation der resultierenden zweiten Schicht der Porositäts-, Hohlraum- und Wärmeübertragungsspezifikation einer Platte äquivalent ist, welche eine Porengröße von wenigstens 2-50 Mikrometern und eine Dicke von 0,0127-0,0254 Zentimetern (0.005-0.010 Zoll) hat.
 10. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Preßteil (12B, 32) eine Preßwalze (12B) und einen Fasermetalldfilz (32) aufweist, der zwischen der Preßwalze (12B) und der Bahn (WB) angeordnet ist, so daß im Betrieb der Vorrichtung der Metalldfilz (32) mit der Bahn (WB) durch die Preßpartie (16B) hindurchgeht.
 11. Vorrichtung nach Anspruch 10, dadurch gekennzeichnet, daß die Heizeinrichtung (22B) den Metalldfilz (32) unmittelbar vor dem Hindurchgang durch die Preßpartie (16B) erwärmt.
 12. Vorrichtung nach Anspruch 11, dadurch gekennzeichnet, daß die Porositäts-, Hohlraumvolumen- und Wärmeübertragungsspezifikation des Metalldfilzes (32) der Spezifikation einer gesinterten Platte äquivalent ist, welche eine Porengröße von 2-50 Mikrometern und eine Dicke von 0,0127-

0,0254 Zentimetern (0.005-0.010 Zoll) hat.

13. Vorrichtung nach Anspruch 11, dadurch gekennzeichnet, daß sie weiter aufweist:
eine Reinigungseinrichtung (34) zum Reinigen des Metallfilzes (32), wobei die Reinigungseinrichtung (34) eine Einrichtung (36) aufweist zum Hindurchleiten eines Reinigungsmediums durch den Metallfilz (32) zu einer Oberfläche (24B) des Metallfilzes (32), die mit der Bahn (WB) in Kontakt ist, so daß Verunreinigungen, die durch den Metallfilz (32) während des Betriebes der Vorrichtung aufgenommen worden sind, aus dem Metallfilz (32) ausgestoßen werden. 5
14. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die erste Schicht (26C) belüftet ist, so daß Fluid, das in die Preßoberfläche (24C) eintritt, durch die zweite Schicht (28C) hindurch in die erste Schicht (26C) gelangt. 10
15. Vorrichtung nach Anspruch 14, dadurch gekennzeichnet, daß die erste Schicht (26C) genutzt ist. 15
16. Vorrichtung nach Anspruch 14, dadurch gekennzeichnet, daß die erste Schicht (26C) mit Sackbohrungen versehen ist. 20
17. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Preßteil (12E) weiter eine erste, massive innere Schicht (26E) und eine zweite, äußere Schicht (28E), welche sich um die erste Schicht (26E) erstreckt, aufweist, wobei die zweite Schicht (28E) eine Porengröße zwischen 5-50 Mikrometern hat, und eine dritte Schicht (44), die als Zwischenschicht zwischen der ersten und zweiten Schicht (26E, 28E) angeordnet ist, wobei die dritte Schicht (44) eine Porengröße innerhalb des Bereiches von 50-100 Mikrometern hat, so daß die dritte Schicht (44) das Belüften der zweiten Schicht (28E) und der Bahn (WE) unterstützt. 30
18. Verfahren zum Entfernen von Fluid aus einer Faserbahn (WB), wobei das Verfahren die Schritte beinhaltet:
Hindurchleiten der Faserbahn (WB) durch eine langgestreckte Preßpartie (16B), die zwischen einer Preßwalze (12B) und einem Tuch (14B) gebildet ist, so daß die Bahn (WB) und das Tuch (14B) sich gemeinsam durch die langgestreckte Preßpartie (16B) bewegen,
Pressen der Bahn (WB) zwischen der Preßwalze (12B) und dem Tuch (14B) während des Durchgangs durch die langgestreckte Preßpartie (16B),
gekennzeichnet durch Vorsehen eines langgestreckten Anpreßschuhs (18B) zum Andrücken 35

des Tuches (14B) an die Preßwalze (12B), wobei das Tuch (14B) zwischen der Bahn (WB) und dem langgestreckten Anpreßschuh (18B) in der Preßpartie (16B) angeordnet ist,
Erhitzen eines Fasermetallfilzes (32), der sich durch die langgestreckte Preßpartie (16B) erstreckt, wobei der Metallfilz (32) unmittelbar vor dem Hindurchgang des Metallfilzes (32) durch die Preßpartie (16B) erhitzt wird, so daß die Wärme, die aus dem Metallfilz (32) auf die Bahn (WB) übertragen wird, ausreicht, um einen Teil des in der Bahn (WB) enthaltenen Fluids zu verdampfen, so daß das Fluid in der flüssigen Phase innerhalb der Bahn (WB) durch den Dampf aus der Bahn hinausgedrückt wird, während eine Schichtablösung der Bahn (WB) durch eine poröse Preßoberfläche (24B) verhindert wird, die durch den Fasermetallfilz (32) gebildet ist. 40

Revendications

1. Appareil pour éliminer un fluide d'une bande fibreuse (W; WA; WB; WC; WD; WE), ledit appareil englobant un élément de presse (12; 12A; 12B, 32; 12C; 12D; 12E),
un moyen de blanchet (14; 14A; 14B; 14C; 14D; 14E) coopérant avec ledit élément de presse (12; 12A; 12B, 32; 12C; 12D; 12E) pour définir entre eux une section de pressage allongée (16; 16A; 16B; 16C; 16D; 16E) de telle sorte que la bande soit pressée entre l'élément de presse (12; 12A; 12B, 32; 12C; 12D; 12E) et le moyen de blanchet (14; 14A; 14B; 14C; 14D; 14E) au cours de son passage à travers la section de pressage (16; 16A; 16B; 16C; 16D; 16E), et
un moyen de chauffage (22; 22A; 22B; 22C; 22D; 22E) disposé en position adjacente audit élément de presse (12; 12A; 12B, 32; 12C; 12D; 12E),
caractérisé en ce qu'un sabot de pressage (18; 18A; 18B; 18C; 18D; 18E) presse ledit moyen de blanchet (14; 14A; 14B; 14C; 14D; 14E) en direction dudit élément de presse (12; 12A; 12B, 32; 12C; 12D; 12E) de telle sorte que, lorsque la bande (W; WA; WB; WC; WD; WE) passe à travers ladite section de pressage (16; 16A; 16B; 16C; 16D; 16E), du fluide s'élimine de la bande (W; WA; WB; WC; WD; WE),
lesdits moyens de chauffage (22; 22A; 22B; 22C; 22D; 22E) sont disposés en amont par rapport à ladite section de pressage (16; 16A; 16B; 16C; 16D; 16E) pour chauffer ledit élément de presse (12; 12A; 12B, 32; 12C; 12D; 12E) et ils sont structurés de telle sorte que, lorsque la bande (W; WA; WB; WC; WD; WE) passe par ladite section de pressage (16; 16A; 16B; 16C; 16D; 16E), la bande (W; WA; WB; WC; WD; WE) 45

- est soumise pendant un laps de temps prolongé à une augmentation de pression et de température, si bien que la vapeur d'eau générée au sein de ladite section de pressage (16; 16A; 16B; 16C; 16D; 16E) au cours de son passage à travers ladite section de pressage (16; 16A; 16B; 16C; 16D; 16E), force le fluide en phase liquide à l'écart de la bande (W; WA; WB; WC; WD; WE), et
- l'élément de presse (12; 12A; 12B, 32; 12C; 12D; 12E) définit une surface de pressage (24; 24A; 24B; 24C; 24D; 24E) qui est poreuse pour inhiber le décollement de la bande (W; WA; WB; WC; WD; WE).
2. Appareil selon la revendication 1, caractérisé en ce que ladite surface de pressage (24; 24A; 24C; 24D; 24E) est cylindrique.
 3. Appareil selon la revendication 2, caractérisé en ce que ledit élément de presse (12; 12C; 12D; 12E) englobe, en outre :
 - une première couche coaxiale (26; 26C; 26D; 26E),
 - une seconde couche coaxiale (28; 28C; 28D; 28E) s'étendant autour de ladite première couche (26; 26C; 26D; 26E), ladite seconde couche (28; 28C; 28D; 28E) définissant ladite surface cylindrique de pressage (24; 24A; 24C; 24D; 24E).
 4. Appareil selon la revendication 3, caractérisé en ce que ladite seconde couche (28; 28C; 28D; 28E) est frittée.
 5. Appareil selon la revendication 4, caractérisé en ce que ladite seconde couche frittée (28; 28C; 28D; 28E) possède une dimension de pore d'au moins 2 microns.
 6. Appareil selon la revendication 4, caractérisé en ce que ladite seconde couche (28; 28C; 28D; 28E) a une épaisseur d'au moins 0,0127 cm (0,005 pouce).
 7. Appareil selon la revendication 4, caractérisé en ce que ladite seconde couche (28; 28C; 28D; 28E) est enduite par projection sur ladite première couche (26; 26C; 26D; 26E).
 8. Appareil selon la revendication 4, caractérisé en ce que ladite seconde couche (28; 28C; 28D; 28E) est enduite par projection sur la surface externe de ladite première couche (26; 26C; 26D; 26E) qui concerne un cylindre de support de presse à écartement linéaire étendu.
 9. Appareil selon la revendication 7, caractérisé en ce que ladite seconde couche (28; 28C; 28D; 28E) est appliquée sur ladite première couche (26; 26C; 26D; 26E) par une technique de revêtement par projection dans laquelle la spécification quant à la porosité, quant au volume de vide et quant au transfert de chaleur de ladite seconde couche résultante, est équivalente à la spécification quant à la porosité, quant au volume de vide et quant au transfert de chaleur d'une plaque ayant une dimension de pore d'au moins 2-50 microns et une épaisseur de 0,0127-0,0254 cm (0,005-0,010 pouce).
 10. Appareil selon la revendication 1, caractérisé en ce que ledit élément de presse (12B, 32) englobe un cylindre de presse (12B) et un feutre métallique en fibres (32) disposé entre le cylindre de presse (12B) et la bande (WB) de telle sorte que, lors de la mise en service dudit appareil, ledit feutre métallique (32) passe avec ladite bande (WB) à travers ladite section de pressage (16B).
 11. Appareil selon la revendication 10, caractérisé en ce que ledit moyen de chauffage (22B) chauffe ledit feutre métallique (32) immédiatement avant son passage à travers la section de pressage (16B).
 12. Appareil selon la revendication 11, caractérisé en ce que la spécification quant à la porosité, quant au volume de vide et quant au transfert de chaleur dudit feutre métallique (32), est équivalente à la spécification d'une plaque frittée ayant une dimension de pore de 2-50 microns et une épaisseur de 0,0127-0,0254 cm (0,005-0,010 pouce).
 13. Appareil selon la revendication 11, caractérisé en ce qu'il englobe, en outre :
 - un moyen de nettoyage (34) pour nettoyer ledit feutre métallique (32), ledit moyen de nettoyage (34) englobant un moyen (36) pour faire passer un milieu de nettoyage à travers ledit feutre métallique (32) en direction de la surface (24B) dudit feutre métallique (32), qui vient se mettre en contact avec la bande (WB), si bien que des contaminants récoltés par ledit feutre métallique (32) lors de la mise en service de l'appareil sont éjectés dudit feutre métallique (32).
 14. Appareil selon la revendication 3, caractérisé en ce que ladite première couche (26C) est munie d'évents, si bien que le fluide pénétrant dans ladite surface de pressage (24C) passe à travers ladite seconde couche (28C) et entre dans ladite première couche (26C).
 15. Appareil selon la revendication 14, caractérisé en ce que ladite première couche (26C) est rainurée.

16. Appareil selon la revendication 14, caractérisé en ce que ladite première couche (26C) est munie d'alésages borgnes.

17. Appareil selon la revendication 1, caractérisé par le fait que ledit élément de presse (12E) englobe, en outre, une première couche interne pleine (26E), une deuxième couche externe (28E) s'étendant autour de ladite première couche (26E), ladite deuxième couche (28E) ayant une dimension de pore entre 5 et 50 microns, et une troisième couche intermédiaire (44) disposée entre lesdites première et deuxième couches (26E, 28E), respectivement, ladite troisième couche (44) ayant une dimension de pore dans le domaine de 50 à 100 microns de telle sorte que ladite troisième couche (44) favorise la ventilation de ladite deuxième couche (28E) et de la bande (WE).

18. Procédé pour éliminer un fluide d'une bande fibreuse (WB), le procédé comprenant les étapes consistant à:

guider la bande fibreuse (WB) à travers une section de pressage allongée (16B) définie entre un cylindre de presse (12B) et un blanchet (14B) de telle sorte que la bande (WB) et le blanchet (14B) se déplacent conjointement à travers la section de pressage allongée (16B);

presser la bande (WB) entre le cylindre de presse (12B) et le blanchet (14B) au cours de leur passage à travers la section de pressage allongée (16B),

caractérisé par le fait de procurer un sabot de pressage (18B) à écartement linéaire étendu pour presser le blanchet (14B) en direction du cylindre de presse (12B), le blanchet (14B) étant disposé entre la bande (WB) et le sabot de pressage (18B) à écartement linéaire étendu dans la section de pressage (16B);

chauffer un feutre métallique en fibres (32) s'étendant à travers la section de pressage allongée (16B), le feutre métallique (32) étant chauffé immédiatement avant le passage du feutre métallique (32) à travers la section de pressage (16B) de telle sorte que la chaleur transférée à la bande (WB) par le feutre métallique (32) est suffisante pour évaporer une portion du fluide contenu dans la bande (WB), si bien que le fluide en phase liquide au sein de la bande (WB) est forcé par la vapeur à l'écart de la bande, tout en inhibant le décollement de la bande (WB) à l'intervention d'une surface poreuse de pressage (24B) définie par le feutre métallique en fibres (32).

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