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(54) **A PRESS APPARATUS**

PRESSVORRICHTUNG

DISPOSITIF DE PRESSE

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WO-A-93/12289 **DE-A- 19 633 958**
US-A- 5 705 034 **US-E- R E30 268**

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Description

[0001] The present invention relates to a press apparatus for pressing water from a formed web.

[0002] More specifically, the present invention relates to an extended nip press apparatus for pressing water from a formed web.

[0003] A formed web typically has between 50 to 90 percent water therein. Consequently, a large proportion of such water is removed from the web by pressing the web.

[0004] Typically, a formed web is guided between a pair of counter rotating rolls which define therebetween a press nip. The press nip presses water from the web so that the web can be guided towards a drying section in which the web extends around a plurality of heated drying cylinders which remove most of the remaining water therefrom.

[0005] More recently, extended nip press arrangements have been commercialized for removing greater quantities of water from the web prior to guiding the web around the heated drying cylinders.

[0006] Extended nip press arrangements typically include a backing roll and a press shoe having a concave surface which cooperates with the backing roll for defining therebetween an extended nip for the passage therethrough of the web.

[0007] Extended nip press arrangements of this type are known for example from DE-A-196 33 958, WO-A-93 122 89, and US-E-RE30 268.

[0008] In US-A-5 705 034 there is described a press apparatus according to the preamble of claim 1. More particularly, in the press apparatus according to US-A-5 705 034, the extended nip press arrangement includes a first backing roll cooperating with a first extended nip press shoe and a second backing roll associated with a second extended nip press shoe, each of the first and second press shoes being looped by separate bearing blankets.

[0009] It is a primary objective of the present invention to provide an extremely compact press arrangement which not only enables the removal of a considerable amount of water from the web prior to the web being guided through the dryer section but also eliminates the need for more than one compensated center roll.

[0010] To achieve this, the press apparatus of the invention is characterized by the features claimed in the characterizing part of claim 1.

[0011] The present invention includes a combination of a typical roll couple press followed by a first and second extended nip press.

[0012] However, the present invention is unique in that the press apparatus includes a center roll which is common to the roll nip and both of the extended nips. Such an arrangement greatly reduces the overall cost of the press apparatus so that only one deflection compensated center roll is required.

[0013] Other features and advantages of the present

invention will be readily apparent to those skilled in the art by a consideration of the detailed description contained hereinafter taken in conjunction with the annexed drawings.

[0014] The present invention relates to a press apparatus for pressing water from a formed web. The apparatus includes a press frame and a center roll which is rotatably supported by the frame.

[0015] An upstream roll cooperates with the center roll for defining therebetween a roll nip for the passage therethrough of the web. The arrangement is such that a first portion of water is removed from the web when the web extends through the roll nip.

[0016] An extended nip press shoe is disposed downstream relative to the roll nip. The first shoe defines a first concave surface which cooperates with the center roll for defining therebetween a first extended nip for the passage therethrough of the pressed web. The arrangement is such that a second portion of water is removed from the web when the pressed web extends through the first extended nip.

[0017] A second extended nip press shoe is disposed downstream relative to the first shoe. The second shoe defines a second concave surface which cooperates with the center roll for defining therebetween a second extended nip for the passage therethrough of the pressed web. The arrangement is such that a third portion of water is removed from the web when the pressed web extends through the second extended nip.

[0018] In a more specific embodiment of the present invention, the press frame rotatably supports the upstream roll.

[0019] Also, the center roll comes into direct surface contact with a first side of the web.

[0020] Additionally, the center roll is a deflection compensated roll.

[0021] The press apparatus according to the present invention also includes a press felt which extends through the first roll nip. The arrangement is such that the web is disposed between the press felt and the center roll during passage of the web through the roll nip.

[0022] Furthermore, the press apparatus according to the present invention includes a looped bearing blanket which slidably cooperates with the first press shoe. The bearing blanket supports and guides the web during passage of the web through the first extended nip. The arrangement is such that the web is disposed between the bearing blanket and the center roll during passage of the web through the first extended nip.

[0023] More specifically, a first side of the web comes into direct surface contact with the center roll during passage of the web through the first extended nip.

[0024] Also, the bearing blanket slidably cooperates with the second press shoe. The bearing blanket supports and guides the web during passage of the web through the second extended nip. More specifically, the first side of the web comes into direct surface contact with the center roll during passage of the web through

the second extended nip.

[0025] Additionally, a lead-in roll is disposed downstream relative to the second extended nip and a dryer felt extends around the lead-in roll. The arrangement is such that the web is transferred from the center roll to the dryer felt downstream from the second extended nip.

[0026] Many modifications and variations of the present invention will be readily apparent to those skilled in the art by a consideration of the detailed description contained hereinafter taken in conjunction with the annexed drawings. However, such modifications and variations fall within the scope of the present invention as defined by the appended claims.

Fig. 1 is a diagrammatic representation of the press apparatus according to the present invention.

Fig. 2 is a side elevational view of a preferred embodiment of the present invention.

[0027] Similar reference characters refer to similar parts throughout the best view of the drawings.

[0028] Fig. 1 is a diagrammatic representation of a press apparatus 10 for pressing water from a formed web W.

[0029] As shown in Fig. 1, the apparatus 10 includes a press frame and a center roll 12 which is rotatably supported by the frame.

[0030] An upstream roll 14 cooperates with the center roll 12 for defining therebetween a roll nip N1 for the passage therethrough of the web W. The arrangement is such that a first portion of water is removed from the web W when the web extends through the roll nip N1.

[0031] A first extended nip press shoe 16 is disposed downstream relative to the roll nip N1. The first shoe 16 defines a first concave surface 18 which cooperates with the center roll for defining therebetween a first extended nip N2 for the passage therethrough of the pressed web W. The arrangement is such that a second portion of water is removed from the web W when the pressed web W extends through the first extended nip N2.

[0032] A second extended nip press shoe 20 is disposed downstream relative to the first shoe 16. The second shoe 20 defines a second concave 22 surface which cooperates with the center roll 12 for defining therebetween a second extended nip N3 for the passage therethrough of the pressed web W.

[0033] The arrangement is such that a third portion of water is removed from the web when the pressed web extends through the second extended nip N3.

[0034] Fig. 2 is a more detailed side elevational view of the preferred embodiment of the present invention. As shown in Fig. 2, the frame 24 rotatably supports the upstream roll 14 and the center roll 12 comes into direct surface contact with a first side 26 of the web W.

[0035] Preferably, the center roll 12 is a deflection compensated roll otherwise known as a crown compensated roll.

[0036] The press apparatus 10 also includes a press

felt F which extends through the roll nip N1. The arrangement is such that the web W is disposed between the press felt F and the center roll 12 during passage of the web W through the roll nip N1.

[0037] A looped bearing blanket 28 slidably cooperates with the first press shoe 16. The bearing blanket supports 28 and guides the web W during passage of the web W through the first extended nip N2. The arrangement is such that the web W is disposed between the bearing blanket 28 and the center roll 12 during passage of the web W through the first extended nip N2.

[0038] As is well known in the art, the first extended nip N2 includes a press felt 30 disposed between the bearing blanket 28 and the web W. Alternatively, the extended nip N2 may be double felted in which a press felt is disposed on both sides of the web W during passage through the first extended nip N2.

[0039] In a preferred embodiment of the present invention, the first side 26 of the web W comes into direct surface contact with the center roll 12 during passage of the web W through the first extended nip N2. In the aforementioned arrangement, only one press felt 30 is included and such press felt is disposed between the bearing blanket 28 and the first press shoe 16.

[0040] Additionally, the bearing blanket 28 slidably cooperates with the second press shoe 20. The bearing blanket 28 supports and guides the web W during passage of the web W through the second extended nip N3.

[0041] In the arrangement shown in Fig. 2, the first side 26 of the web W comes into direct surface contact with the center roll 12 during passage of the web W through the second extended nip N3.

[0042] Additionally, the press apparatus as shown in Fig. 2 includes a lead-in roll 32 which is disposed downstream relative to the second extended nip N3.

[0043] Also, a dryer felt 34 extends around the lead-in roll 32, the arrangement being such that the web W is transferred from the center roll 12 to the dryer felt 34 downstream from the second extended nip N3.

[0044] The present invention provides an extremely compact press arrangement which not only enables the removal of a considerably amount of water from the web prior to the web being guided through the dryer section but also eliminates the need for more than one compensated center roll.

Claims

1. A press apparatus (10) for pressing water from the formed web (w), said apparatus comprising:
 - a press frame (24),
 - a center roll (12) rotatably supported by said frame (24),
 - an upstream roll (14) cooperating with said center roll (12) for defining therebetween a roll nip (N1) for the passage therethrough of the

web (w), the arrangement being such that a first portion of water is removed from the web (w) when the web (w) extends through said roll nip (N1), and

a looped bearing blanket (28) slidably cooperating with said center roll (12) for defining therebetween an extended nip press section disposed downstream relative to said roll nip (N1) such that the web (w) is pressed between said center roll (12) and said bearing blanket (28) during passage of the web (w) through said extending nip press section ,

said extended nip press section comprising a first extended nip press shoe (16) defining a first concave surface (18) which cooperates with said center roll (12) for defining therebetween a first extended nip (N2) for the passage therethrough of the pressed web (w),

said bearing blanket (28) slidably cooperating with said first press shoe (16), said bearing blanket (28) supporting and guiding the web (w) during passage of the web (w) through said first extended nip (N2), the arrangement being such that the web (w) is disposed between said bearing blanket (28) and said center roll (12) during passage of the web (w) through said first extended nip (N2), whereby a second portion of water is removed from the web (w) when the bearing blanket (28) and the pressed web (w) extend through said first extended nip (N2),

characterized in that said extended nip press section further comprises a second extended nip press shoe (20) disposed downstream relative to said first press shoe (16), said second press shoe (20) defining a second concave surface (22) which cooperates with said center roll (12) for defining therebetween a second extended nip (N3) for the passage therethrough of the pressed web (w), and

in that said bearing blanket (28) slideably cooperates with said second press shoe (20), said bearing blanket (28) supporting and guiding the web (w) during passage of the web (w) through said second extended nip (N3), the arrangement being such that the web (w) is disposed between said bearing blanket (28) and said center roll (12) during passage of the web (w) through said second extended nip (N3), whereby a third portion of water is removed from the web (w) when the bearing blanket (28) and the pressed web (w) extend through said second extended nip (N3).

2. A press apparatus as set forth in claim 1, **characterized in that** said press frame (24) rotatably supports said upstream roll (14).
3. A press apparatus as set forth in claim 1, **characterized in that** said center roll (12) comes into direct

surface contact with a first side of the web (w).

4. A press apparatus as set forth in claim 1, **characterized in that** said center roll (12) is a deflection compensated roll.

5. A press apparatus as set forth in claim 1, **characterized in further including:**

a press felt (F) which extends through said roll nip (N1), the arrangement being such that the web (w) is disposed between said press felt (F) and said center roll (12) during passage of the web (w) through said roll nip (N1).

6. A press apparatus as set forth in claim 1, **characterized in that** a first side of the web (w) comes into direct surface contact with said center roll (12) during passage of the web (w) through said first extended nip (N2).

7. A press apparatus as set forth in claim 1, **characterized in that** a first side of the web (w) comes into direct surface contact with said center roll (12) during passage of the web (w) through said second extended nip (N3).

8. A press apparatus as set forth in claim 1, **characterized in further including:**

a lead-in roll (32) disposed down relative to said second extended nip (N3), and
a dryer felt (34) extending around said lead-in roll (32), the arrangement being such that the web (w) is transferred from said center roll (12) to said dryer felt (34) downstream from said second extended nip (N3).

Patentansprüche

1. Eine Pressvorrichtung (10) zum Pressen von Wasser aus einer ausgebildeten Bahn (w) (formed web), wobei die Vorrichtung umfasst:

einen Pressrahmen (24),
eine Zentrierwalze (12), die durch den Rahmen drehbar unterstützt wird,
eine Stromaufwärtswalze (14), die mit der Zentrierwalze (12) zusammenwirkt, um dazwischen einen Walzenspalt (N1) zum Durchlauf der Bahn (w) auszubilden, wobei die Anordnung derart ist, dass der erste Teil an Wasser aus der Bahn (w) entfernt wird wenn die Bahn (w) sich durch den Walzenspalt (N1) ausweitet, und
ein schleifenförmiges Lagerdrucktuch (28), das gleitend mit der Zentrierwalze (12) zusammen-

wirkt, um dazwischen einen ausgeweiteten Walzenspaltpressbereich zu definieren, der stromabwärts relativ zu dem Walzenspalt (N1) angeordnet ist, so dass die Bahn (w) zwischen die Zentrierwalze (12) und das Lagerdrucktuch (28) gepresst wird, während die Bahn (w) durch den sich ausweitenden Walzenspaltpressbereich läuft,

der ausgeweitete Walzenspaltpressbereich umfasst einen ersten ausgeweiteten Walzenspaltpressschuh (16), der eine erste konkave Oberfläche (18) definiert, die mit der Zentrierwalze (12) zusammenwirkt, um dazwischen einen ersten ausgeweiteten Walzenspalt (N2) zum Durchlaufen der gepressten Bahn (w) zu definieren,

das Lagerdrucktuch (28) wirkt gleitend mit dem ersten Pressschuh (16) zusammen, das Lagerdrucktuch (28) unterstützt und leitet die Bahn (w) während dem Durchlaufen der Bahn (w) durch den ersten ausgeweiteten Walzenspalt (N2), die Anordnung ist derart, dass die Bahn (w) zwischen dem Lagerdrucktuch (28) und der Zentrierwalze (12) angeordnet ist, während die Bahn (w) durch den ersten ausgeweiteten Walzenspalt (N2) läuft, wobei ein zweiter Teil an Wasser aus der Bahn (w) entfernt wird wenn sich das Lagerdrucktuch (28) und die gepresste Bahn (w) durch den ersten ausgeweiteten Walzenspalt (N2) ausweiten,

dadurch gekennzeichnet, dass der ausgeweitete Walzenspaltpressbereich weiterhin einen zweiten ausgeweiteten Walzenspaltpressschuh (20) umfasst, der stromabwärts relativ zum ersten Pressschuh (16) angeordnet ist, der zweite Pressschuh (20) eine zweite konkave Oberfläche (22) definiert, die mit der Zentrierwalze (12) zusammenwirkt, um dazwischen einen zweiten ausgeweiteten Walzenspalt (N3) zum Durchlaufen der gepressten Bahn (w) zu definieren, und

dass das Lagerdrucktuch (28) gleitend mit dem zweiten Pressschuh (20) zusammenwirkt, das Lagerdrucktuch (28) die Bahn (w) während dem Durchlaufen der Bahn (w) durch den zweiten ausgeweiteten Walzenspalt (N3) unterstützt und leitet, die Anordnung ist derart, dass die Bahn (w) zwischen dem Lagerdrucktuch (28) und der Zentrierwalze (12) angeordnet ist, während die Bahn (w) durch den zweiten ausgeweiteten Walzenspalt (N3) läuft, wobei ein dritter Teil an Wasser aus der Bahn (w) entfernt wird wenn sich das Lagerdrucktuch (28) und die gepresste Bahn (w) durch den zweiten ausgeweiteten Walzenspalt (N2) ausweiten.

2. Eine Pressvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Pressrahmen (24) die Stromaufwärtswalze (14) drehbar unterstützt.

3. Eine Pressvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Zentrierwalze (12) in direkten Oberflächenkontakt mit einer ersten Seite der Bahn (w) kommt.

4. Eine Pressvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Zentrierwalze (12) eine ablenkungskompensierte Walze ist.

5. Eine Pressvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** sie weiterhin umfasst:

ein Pressfilz (F), das sich durch den Walzenspalt (N1) ausweitet, die Anordnung ist derart, dass die Bahn (w) zwischen dem Pressfilz (F) und der Zentrierwalze (12) angeordnet ist, während die Bahn (w) durch den Walzenspalt (N1) läuft.

6. Eine Pressvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** eine erste Seite der Bahn (w) in direkten Oberflächenkontakt mit der Zentrierwalze (12) kommt, während die Bahn (w) durch den ersten ausgeweiteten Walzenspalt (N2) läuft.

7. Eine Pressvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** eine erste Seite der Bahn (w) in direkten Oberflächenkontakt mit der Zentrierwalze (12) kommt, während die Bahn (w) durch den zweiten ausgeweiteten Walzenspalt (N3) läuft.

8. Eine Pressvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** sie weiterhin umfasst:

eine Einleitewalze (32), die unten relativ zu dem zweiten ausgeweiteten Walzenspalt (N3) angebracht ist, und
ein Trockenfilz (34), das sich um die Einleitewalze (32) ausweitet, die Anordnung ist derart, dass die Bahn (w) von der Zentrierwalze (12) auf das Trockenfilz (34) stromabwärts von dem zweiten ausgeweiteten Walzenspalt (N3) übertragen wird.

Revendications

1. Appareil de presse (10) pour presser de l'eau à partir d'une bande formée (w), ledit appareil comprenant :

un cadre de presse (24) ;
un rouleau de centrage (12) supporté en rotation par ledit cadre (24) ;
un rouleau (14) disposé en amont coopérant avec ledit rouleau de centrage (12) pour définir entre eux un écartement de pincement (N1) pour le passage de la bande (w), l'arrangement

étant tel qu'une première portion d'eau est éliminée de la bande (w) lorsque la bande (w) s'étend à travers ledit écartement de pincement (N1) ; et

un blanchet de support en boucle (28) coopérant par glissement avec ledit rouleau de centrage (12) pour définir entre eux une section de presse du type à écartement de pincement étendu disposée en aval par rapport audit écartement de pincement (N1) de telle sorte que la bande est pressée entre ledit rouleau de centrage (12) et ledit blanchet de support (28) lors du passage de la bande (w) à travers ladite section de presse du type à écartement de pincement étendu ;

ladite section de presse du type à écartement de pincement étendu comprenant un premier sabot de presse du type à écartement de pincement étendu (16) définissant une première surface concave (18) qui coopère avec ledit rouleau de centrage (12) pour définir entre eux un premier écartement de pincement étendu pour le passage de la bande pressée (w) ;

ledit blanchet de support (28) coopérant par glissement avec ledit premier sabot de presse (16), ledit blanchet de support (28) supportant la bande (w) au cours du passage de la bande (w) à travers ledit premier écartement de pincement étendu (N2), l'arrangement étant tel que la bande (w) est disposée entre ledit blanchet de support (28) et ledit rouleau de centrage (12) au cours du passage de la bande (w) à travers ledit premier écartement de pincement étendu (N2), par lequel une deuxième portion d'eau est éliminée de la bande (w) lorsque le blanchet de support (28) et la bande pressée (w) s'étendent à travers ledit premier écartement de pincement étendu (N2) ;

caractérisé en ce que ladite section de presse du type à écartement de pincement étendu comprend en outre un deuxième sabot de presse du type à écartement de pincement étendu (20) disposé en aval par rapport audit premier sabot de presse (16), ledit deuxième sabot de presse (20) définissant une deuxième surface concave (22) qui coopère avec ledit rouleau de centrage (12) pour définir entre eux un deuxième écartement de pincement étendu (N3) pour le passage de la bande pressée (w), et

en ce que ledit blanchet de support (28) coopère par glissement avec ledit deuxième sabot de presse (20), ledit blanchet de support (28) supportant la bande (w) au cours du passage de la bande (w) à travers ledit deuxième écartement de pincement étendu (N3), l'arrangement étant tel que la bande (w) est disposée entre ledit blanchet de support (28) et ledit rouleau de centrage (12) au cours

du passage de la bande (w) à travers ledit deuxième écartement de pincement étendu (N3), par lequel une troisième portion d'eau est éliminée de la bande (w) lorsque le blanchet de support (28) et la bande pressée (w) s'étendent travers ledit deuxième écartement de pincement étendu (N3).

2. Appareil de presse selon la revendication 1, **caractérisé en ce que** ledit cadre de presse (24) supporte en rotation ledit rouleau (14) disposé en amont.

3. Appareil de presse selon la revendication 1, **caractérisé en ce que** ledit rouleau de centrage (12) entre en contact superficiel direct avec un premier côté de la bande (w).

4. Appareil de presse selon la revendication 1, **caractérisé en ce que** ledit rouleau de centrage (12) est un rouleau à flexion compensée.

5. Appareil de presse selon la revendication 1, **caractérisé en ce qu'il** englobe en outre :

un feutre de presse (F) qui s'étend à travers ledit écartement de pincement (N1), l'arrangement étant tel que la bande est disposée entre ledit feutre de presse (F) et ledit rouleau de centrage (12) lors du passage de la bande (w) à travers ledit écartement de pincement (N1).

6. Appareil de presse selon la revendication 1, **caractérisé en ce qu'un** premier côté de la bande (w) entre en contact superficiel direct avec ledit rouleau de centrage (12) lors du passage de la bande (w) à travers ledit premier écartement de pincement étendu (N2).

7. Appareil de presse selon la revendication 1, **caractérisé en ce qu'un** premier côté de la bande (w) entre en contact superficiel direct avec ledit rouleau de centrage (12) lors du passage de la bande (w) à travers ledit deuxième écartement de pincement étendu (N2).

8. Appareil de presse selon la revendication 1, **caractérisé en ce qu'il** englobe en outre :

un rouleau d'amorçage (32) disposé en dessous dudit deuxième écartement de pincement étendu (N3) ; et

un feutre sécheur (34) s'étendant autour dudit cylindre d'amorçage (32), l'arrangement étant tel que la bande est transférée dudit rouleau de centrage (12) audit feutre sécheur (34) en aval dudit deuxième écartement de pincement étendu (N3).

