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- (54) **Papermaking machine in which the paper web is supported in the draw between the press and dryer sections.**

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Description

Background of the Invention

The conventional papermaking machine includes a press section having one or more pairs of cooperating press rolls and the wet paper web is supported on a papermaker's felt as it passes through the nip between the cooperating rolls, thereby extracting water from the web. After leaving the press section, the paper web is transferred to the dryer section which can consist of a plurality of heated dryer rolls. The paper web passes sequentially around the dryer rolls to remove further moisture from the paper.

In some installations, there is a substantial draw or span between the press section and the dryer section. The paper web is fairly wet and heavy, so that the web can sag in this draw and possibly break. A papermaking machine can be operating at a speed in the neighborhood of 1000 m/min, and if the web breaks, the paper web must be re-fed through the entire press and dryer sections and this not only results in a loss of product, but also results in substantial downtime for the papermaking machine.

Sag in the draw between the press section and the dryer section can be minimized by increasing the tension on the paper web, but an increase in tension will correspondingly tend to stretch the paper web and increase the tendency for breakage. US-A-443 352 shows a construction in which the paper web is sandwiched between two felts as it passes through the nip between the press rolls. After leaving the nip between the press rolls, the paper web, which is still sandwiched between the two felts, passes around the dryer roll. When leaving the press felt and jumping over to the surface of the dryer drum, there is always the risk of a break of the paper web.

GB-A-481 190 shows a system in which the paper web W is located between the felts 63 and 64 is passed through the nip between the suction press roll 65 and a heated roll 66. The paper web is then supported on the lower felt as it passes around the roll 70 and is transferred to the dryer roll 71.

Thereby, the felt does not pass around a first heated dryer roll, which would be roll 71, nor is the paper web spaced from the first dryer roll by the felt.

EP-A-0 344 088 (prior art according to Article 54 (3) EPC) shows a number of different configurations and in the machine such as shown in Fig. 5, the paper web is sandwiched between a pair of felts as it passes through the nip between the press rolls 32 and 34. After leaving the nip, the paper web is supported on the lower felt 24d and

passes around a backing drum 26d where the paper web is picked from the backing drum 26d by the dryer felt 16d. The reference states the web is disposed between the blanket or felt 24d and the felt 16d during passage around the backing drum 26d.

It is the purpose of the invention to provide a papermaking machine and a method of paper making which are designed such that the risk of breaks of the paper web is reduced. This objective is achieved by the features of claims 1 and 2.

Description of the Illustrated Embodiment

The drawing is a schematic representation of a portion of a paper making machine including a press section 1 and a dryer section 2. Press section 1 includes a pair of cooperating press rolls 3 and 4 and a wet paper web 5 is supported by a papermaker's felt 6 as it passes between through the nip between the press rolls 3 and 4. The paper web can be any type of paper, preferably heavier weight paper, such as liner board, newsprint, writing paper, or the like.

The papermaker's felt 6 is endless in configuration and can consist of natural fibers, synthetic fibers, or a combination thereof. The particular construction or composition of the felt is not critical to the invention.

Felt 6 is supported in its endless travel by a plurality of idler rolls, indicated by 7A - 7I. In addition, the felt 6 passes around a tensioning or stretch roll 8, which is located between the rolls 7F and 7G. Roll 8 operates in a conventional manner to provide the desired tension on the felt 6.

Dryer section 2 includes a plurality of conventional heated dryer rolls, three of which are shown in the drawing, and indicated by 9, 10 and 11. In practice, the dryer section may include up to 10 or more rolls which are steam heated to a temperature in the range of 150 °F to 280 °F. The temperature of the rolls in the group may be varied, with the highest temperature being located at the downstream end of the dryer section.

In certain installations there may be a considerable gap or draw between press section 1 and dryer section 2 and this draw can be in the neighborhood of 10 to 15 feet. When dealing with a heavier weight paper, such as liner board, the paper web will be fairly wet and heavy as it leaves the press section, with the result that the paper web has a tendency to sag in the draw between press section 1 and dryer section 2. If the web should break, the paper web from the forming section must be dropped into a disposal site and then re-fed through the press section and dryer section. Refeeding the web may take from one-half to three-quarters of an hour and this down time

results in a substantial decrease in the production rate of the papermaking machine.

To eliminate the sagging of the paper web in the draw between the press section and the dryer section and thereby prevent possible breaking of the web, the felt 6 from the press section is passed around at least one of the dryer rolls in the dryer section. As illustrated, the felt is passed around dryer roll 9 and thus supports the paper web in the draw between the press rolls 3,4 and the dryer roll 9.

As illustrated, the web 5 is located on the outside of felt 6 as it passes around dryer roll 9 and the web then travels around roll 10 and 11. A conventional dryer fabric 12 is mounted for endless travel in the dryer section and as shown, travels around a pair of idler rolls 13. The dryer fabric 12 operates in a conventional manner to support the paper web against the heated dryer rolls to aid in removal of moisture from the web.

While the drawing illustrates the felt 6 being located between the dryer roll 9 and the web 5, it is contemplated that in other installations the paper web may be sandwiched between the felt and the dryer roll. Similarly, the felt 6 from the press section can travel around a plurality of rolls in the dryer section.

The position and number of the idler rolls 7 in the press section is not critical and various paths of travel for the felt are contemplated depending upon the requirements of the papermaking machine.

Claims

1. In a paper making machine, a press section (1) including a plurality of cooperating press rolls (3,4), a papermakers felt (6) mounted for endless travel and supporting a paper web (5) in the nip between said press rolls (3,4), a dryer section (2) including a plurality of heated dryer rolls (9,10,11), a first (9) of said dryer rolls (9,10,11) being located within the endless path of travel of said felt (6), said felt (6) being in direct contact with said first dryer roll (9) and said paper web (5) being spaced from said dryer roll (9) by said felt (6) and the outer surface of the portion of the paper web (5) passing around said first dryer roll (9) being exposed so that the outer surface is free of confinement to thereby heat said felt (6) and said paper web (5), wherein said dryer section (2) includes a second dryer roll (10) spaced from said first dryer roll (9), said paper web (5) being mounted to travel from said first drying roll (9) to said second dryer roll (10) and being unsupported in the space between said first (9) and second (10) dryer rolls.

2. In a method of paper making, the steps of mounting a press felt for travel in an endless path, positioning a first upstream dryer roll (9) of a series of dryer rolls (9,10,11) within said endless path so that said felt (6) passes in direct contact with said first dryer roll (9), heating said first dryer roll (9) to an elevated temperature, supporting a wet paper web (5) on said felt (6), passing the felt (6) and the supported web (5) through a pressure nip to thereby extract water from said web (5), thereafter passing said felt (6) and said supported web (5) around said first heated dryer roll (9) with said felt (6) being positioned between said web (5) and said heated dryer roll (9) and exposing the outer surface of the portion of the web (5) passing around the first dryer roll (9) so that the outer surface is free of confinement to thereby heat said felt (6) and said web (5), separating the web (5) from the felt (6), passing the web (5) around the remaining downstream dryer rolls (10,11) in said series, and returning the heated felt (6) to the pressure nip in position to support said paper web (5).

3. The machine of claim 1, wherein said felt (6) is wrapped around the first dryer roll (9) through an arc of at least 90°.

Patentansprüche

1. Pressenpartie (1) einer Papiermaschine, mit einer Mehrzahl von miteinander zusammenarbeitenden Preßwalzen (3, 4), mit einem endlosen Papiermacherfilz (6), der eine Papierbahn im Spalt zwischen den Preßwalzen (3, 4) trägt, mit einer Trockenpartie (2), die eine Mehrzahl beheizter Trockenzylinder (9, 10, 11) umfaßt, wobei ein erster (9) der Trockenzylinder (9, 10, 11) innerhalb der endlosen Bewegungsbahn des Filzes (6) angeordnet ist, der Filz (6) sich in direktem Kontakt mit dem ersten Trockenzylinder (9) befindet, und die Papierbahn (5) zum Trockenzylinder (9) durch den Filz im Abstand gehalten ist, und die Außenfläche des Teiles der Papierbahn (5), die um den ersten Trockenzylinder (9) herumgeführt ist, derart ausgesetzt ist, daß sie frei von Begrenzungen ist, so daß der Filz (6) und die Papierbahn (5) aufgeheizt werden, wobei die genannte Trockenpartie (2) einen zweiten Trockenzylinder (10) aufweist, der einen Abstand zum ersten Trockenzylinder (9) einnimmt, und die Papierbahn (5) derart angeordnet ist, daß sie vom ersten (9) zum zweiten Trockenzylinder (10) geführt und im Zwischenraum zwischen dem ersten (9) und dem zweiten (10) Trockenzylinder frei von Unterstützung ist.

2. Verfahren zum Herstellen von Papier, mit den Verfahrensschritten des Führens eines Preßfilzes zum Umlaufen in einer endlosen Bahn, wobei ein erster, stromaufwärtiger Trockenzylinder (9) eine Reihe von Trockenzylindern (9, 10, 11) innerhalb der endlosen Bahn angeordnet ist, so daß der genannte Filz (6) in direkter Berührung mit dem ersten Trockenzylinder (9) umläuft, wobei der erste Trockenzylinder (9) auf eine erhöhte Temperatur aufgeheizt wird, wobei eine feuchte Papierbahn (5) vom Filz (6) getragen wird, wobei der Filz (6) und die getragene Papierbahn (5) einen Preßspalt zwecks Abführens von Wasser aus der Papierbahn (5) durchlaufen, worauf der Filz (6) und die getragene Papierbahn (5) um den genannten ersten beheizten Trockenzylinder (9) laufen, wobei der Filz (6) zwischen der Papierbahn (5) und dem beheizten Trockenzylinder (9) angeordnet ist und die Außenfläche des Teiles der Bahn, der um den ersten Trockenzylinder (9) herumläuft, ausgesetzt ist, so daß diese Außenfläche frei von einer Begrenzung ist, so daß der Filz (6) und die Papierbahn aufgeheizt werden, wobei die Papierbahn (5) vom Filz (6) abläuft und um die verbleibenden, stromabwärtigen, in Reihe geschalteten Trockenzylinder (10, 11) herumläuft und der aufgeheizte Filz (6) zum Druckspalt zurückgeführt wird in einer Position, um die genannte Papierbahn (5) zu unterstützen.
3. Maschine nach Anspruch 1, wobei der Filz (6) den ersten Trockenzylinder (9) mit einem Winkel von wenigstens 90° umschlingt.

Revendications

1. Machine de fabrication de papier caractérisée en ce qu'elle comporte une section de pressage (1) comprenant un certain nombre de cylindres de pressage en coopération (3, 4), un feutre de fabrication de papier (6) monté de manière à suivre une course sans fin et à supporter un rouleau de papier (5) dans l'intervalle de pincement entre les cylindres de pressage (3, 4), et une section de séchage (2) comprenant plusieurs cylindres de séchage chauffés (9, 10, 11), le premier cylindre (9) des cylindres de séchage (9, 10, 11) étant placé dans le chemin de passage sans fin du feutre (6), ce feutre (6) étant en contact direct avec le premier cylindre de séchage (9), le rouleau de papier (5) étant séparé du cylindre de séchage (9) par le feutre (6) et la surface extérieure de la partie du rouleau de papier (5) qui passe autour du premier cylindre de séchage (9) étant à découvert de façon que la surface

extérieure ne soit pas emprisonnée pour qu'on puisse ainsi chauffer le feutre (6) et le rouleau de papier (5), la section de séchage (2) comprenant un second cylindre de séchage (10) espacé du premier cylindre de séchage (9), le rouleau de papier (5) étant monté de manière à passer du premier cylindre de séchage (9) au second cylindre de séchage (10) sans être supporté dans l'espace compris entre ce premier cylindre de séchage (9) et ce second cylindre de séchage (10).

2. Procédé de fabrication de papier, procédé caractérisé en ce qu'il comprend les différentes étapes consistant à monter un feutre de pressage destiné à suivre une piste sans fin, à placer un premier cylindre de séchage (9) en amont d'une série de cylindres de séchage (9, 10, 11) dans la piste sans fin du feutre (6) de façon que ce feutre soit en contact direct avec le premier cylindre de séchage (9), à chauffer le premier cylindre de séchage (9) à une température élevée, à placer un rouleau de papier humide (5) sur le feutre (6), à faire passer le feutre (6) supportant le rouleau de papier (5) dans un intervalle de pincement entre les cylindres pour extraire l'eau du rouleau de papier (5), à faire passer ensuite le feutre (6) supportant le rouleau de papier (5) autour du premier cylindre de séchage chauffé (9) de façon que le feutre (6) soit placé entre le rouleau de papier (5) et le cylindre de séchage chauffé (9), à laisser découverte la surface extérieure de la partie du rouleau de papier (5) qui passe autour du premier cylindre de séchage (9) de façon que la surface extérieure ne soit pas emprisonnée pour qu'on puisse ainsi chauffer le feutre (6) et le rouleau de papier (5), à séparer le rouleau de papier (5) du feutre (6), à faire passer le rouleau de papier (5) autour des autres cylindres de séchage (10, 11) situés en aval dans la série de cylindres, et à ramener le feutre chauffé (6) à l'intervalle de pincement de pression de façon que ce feutre soit en place pour supporter le rouleau de papier (5).
3. Machine à papier selon la revendication 1, caractérisée en ce que le feutre (6) est enroulé autour du premier cylindre de séchage (9) sur un arc d'au moins 90°.

