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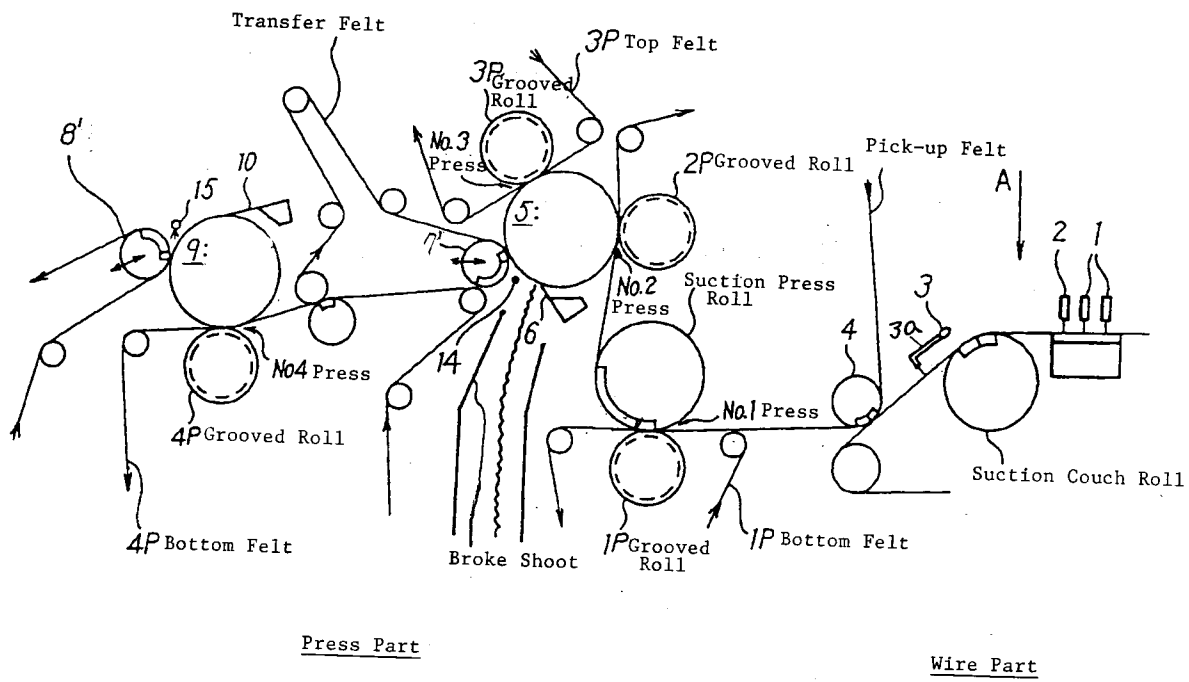
(54) **Press part paper threading system in a paper machine.**

(57) The invention provides an improved press part paper threading system in a paper machine, in which a paper threading work in a press part can be done easily and simply even by a worker having a little experience of operation. In the system for threading a paper web through a press part of a paper machine, a suction transfer roll (8') is employed, a vacuum zone with the roll is divided into a tail zone and a total-width zone, a structure for

allowing switching between the divided vacuum zones is employed, and furthermore a structure for enabling pressing against a press roll with a low nip pressure and also releasing the pressing, is employed. A single set of or a plurality of sets of such suction transfer rolls (7', 8') are provided, and also, a tail cutting device 3 for cutting the tail for threading purpose in the widthwise direction, is equipped.

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Fig. 1



BACKGROUND OF THE INVENTION:

1. Field of the Invention:

The present invention relates to a paper threading system applicable to a press part of a paper machine.

2. Description of the Prior Art:

One example of a press part paper threading system in a heretofore known paper machine is illustrated in Fig. 4. At the time of threading a wet paper web through a press part in a paper machine, as shown in Fig. 4 a net paper web transferred from a wire part to a press part with the aid of a suction pick-up roll 4, passes through a No. 1 press, a No. 2 press and a No. 3 press to be dewatered by the respective presses, and then it is scraped out by means of a center roll doctor 6 and falls in a broke pit for a press (not shown). In this instance, the wet paper web is slitted at the positions of a tail width by means of paper cutting nozzles 2 set at the positions for making a paper threading tail on the wire part, and it is threaded up to a center roll 5 as a sheet trimmed by trimming nozzles 1.

Under the above-mentioned condition, if the tail is blown by means of an air-jet nozzle (not shown) towards a nip portion where a transfer felt 16 engaged with a No. 1 suction transfer roll 7 and a 4P bottom felt come into contact with each other to be transferred to the nip portion, then the tail advances into a nip portion of a No. 4 press, then it is scraped out by a doctor 10 for a 4P top roll and is taken out to the outside by means of a broke conveyor 11 for the 4P top roll.

Subsequently, the tail is threaded up to a No. 1 dryer by means of an air-jet nozzle (not shown), then it is transferred to a dryer part as caught in a carrier rope of a dryer not show, and threading of the tail to the dryer is completed. Thereafter, spreading of a paper web is effected by traversing the paper cutting nozzle 2, and threading of a wet paper web over its entire width is completed. An outline of the condition of slitting by means of the paper cutting nozzle 2 and the condition of trimming by means of the trimming nozzles 1 in the above-described case is shown in Fig. 5.

However, in the heretofore known system, since threading of a paper web from the center roll 5 to the No. 4 press and the threading of a paper web from the No. 4 press to the dryer part are carried out respectively by means of air-jet nozzles, there was a problem that experience of threading was necessary for operation and automatic threading of a paper web was impossible.

Furthermore, because of the fact that at the time of threading a paper web, depending upon skill in the threading technique, wet paper may enter a press nip of the next stage in a coagulated form, there was a problem that a nip pressure would rise partly, resulting in damage of a felt, or rubber of a rubber-coated roll would be damaged due to an excessively large nip pressure on the roll surface.

In addition, the heretofore known press part paper threading system had shortcomings that since an open draw is formed between the center roll 5 and the No. 1 suction transfer roll 7 and between the 4P top roll 9 and the No. 2 suction transfer roll 8 during operation, a sheet tension (a draw value between the presses) for stretching the wet paper sheet is applied, a longitudinal-to-lateral ratio of a product paper strength becomes large, and the quality is degraded, and that for the purpose of broke processing at the time of paper threading, the 4P top roll 9 necessitated a paper scraping doctor and a broke processing apparatus.

SUMMARY OF THE INVENTION:

It is therefore one object of the present invention to provide a press part paper threading system in a paper machine, wherein a paper threading operation can be carried out automatically in a simple manner without necessitating experience nor skill of an operator.

Another object of the present invention is to provide a press part paper threading system in a paper machine, wherein at the time of paper threading, wet paper would not enter a press nip in a coagulated form, and so, damage of a felt nor damage of a roll coating caused by an excessively large nip pressure would not occur.

According to one feature of the present invention, there is provided a press part paper threading system in a paper machine, which comprises at least one set of, that is, one or more sets of suction transfer rolls having an inner vacuum zone divided into a tail zone and a total-width zone, capable of switching the same vacuum zones, and capable of pressing with a low nip pressure against a press roll and releasing the pressing, and a tail cutting device for cutting a tail for threading, in the width-wise direction.

According to another feature of the present invention, there is provided the above-featured press part paper threading system in a paper machine, which further comprises an air-jet nozzle for assisting to scrape out a paper web from a center roll and a top roll.

According to still another feature of the present invention there is provided the above-featured press part paper threading system in a paper ma-

chine, wherein press rolls equipped with a blanket are disposed around the center roll and around the top roll.

In operation, a wet paper web transferred to a press part by a suction pick-up roll is scraped out over its entire width by means of a doctor for a center roll. Subsequently, while the respective No. 1 and No. 2 suction transfer rolls are lightly pressed against the center roll and the top roll, vacuum is exerted upon the vacuum zone corresponding to a tail width. At the same time, cutting of a tail is effected by actuating a tail cutting nozzle in a wire part. When the tip end of the tail cut by the tail cutting nozzle passes through a nip portion of the No. 1 suction transfer roll, the tail would be transferred to the side of a transfer felt by its vacuum force and would enter a nip portion of the No. 4 press. At this moment, an air-jet could be blown towards the tip end of the tail cut in the widthwise direction to assist the transfer to the side of the transfer felt.

The tip end of the tail having passed the nip portion of the No. 4 press, can be smoothly transferred to the side of a dryer canvas by a vacuum force when it passes the nip of the No. 2 suction transfer roll similarly to the No. 1 suction transfer roll. In this case also, like the paper threading between the center roll and the top roll, it is possible to assist the transfer of the tail by means of an air-jet nozzle.

After the threading of the tail of a wet paper web into a dryer has been completed, a tail width is broadened by moving the paper cutting nozzle on the wire part, and a wet paper web having a total width is threaded. At the same time, the vacuum zones of the respective suction transfer rolls are switched to a total-width zone, and automatic paper threading through a press part is completed. However, since the nip widths formed by the No. 1 and No. 2 suction transfer rolls, the center roll and the top roll are short, the case where transfer to the transfer rolls is difficult, is expected. In such cases, if blankets are equipped around the center roll and around the top roll and the blankets are somewhat overlapped with the suction transfer rolls, then nip widths where vacuum acts would be elongated, and it becomes possible to reliably carry out sheet transfer. In this case, the doctor for the center roll is not used, but the total-width sheet is made to fall in a broke pit for a press. Likewise, the top roll also reliably transfers the tail by means of the blanket.

According to the present invention, owing to the above-described structural and operational features, a paper threading operation is carried out automatically in a simple manner, and hence, even an operator having a little experience and skill in the technique can easily achieve the paper thread-

ing operation.

Also, according to the present invention, since coagulated paper would not enter a press nip, damage of a felt nor damage of a roll coating caused by an excessively large nip pressure would not occur, and so, a running cost of a paper machine can be reduced.

In addition, according to the present invention, owing to the fact that an open draw is not present between the respective presses, a longitudinal-to-lateral ratio of a paper strength becomes small, paper quality is improved, breaking of a paper web in the press part is minimized, hence a stable operation at a high speed is possible, and therefore, a productivity can be raised by improving an operation efficiency of a paper machine.

The above-described and other objects, features and advantages of the present invention will become more apparent by reference to the following description of preferred embodiments of the present invention taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS:

In the accompanying drawings:

Fig. 1 is a schematic view showing a layout of an entire press part according to a first preferred embodiment of the present invention;

Fig. 2 is a schematic view as viewed in the direction of an arrow A in Fig. 1;

Fig. 3 is a schematic view showing a layout of a press part according to a second preferred embodiment of the present invention;

Fig. 4 is a schematic view showing a layout of an entire press part in the prior art; and

Fig. 5 is a schematic view as viewed in the direction of an arrow B in Fig. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS:

In the following, the present invention will be described in greater detail in connection the preferred embodiments illustrated in the accompanying drawings. Figs. 1 to 3 show the preferred embodiments of the present invention. At first, referring to Fig. 1, on a wire part are disposed trimming nozzles 1 for determining a paper web width, a paper cutting nozzle 2 for making a tail at the time of threading a paper web, and a tail cutting nozzle 3 having a swing arm 3a for cutting a tail in the widthwise direction in the press part.

A wet paper web on the wire part is transferred to a total-width press part by means of a suction pick-up roll 4, a wet paper web dewatered respectively through a No. 1 press, a No. 2 press and a No. 3 press is scraped out over its entire width by

means of a center roll doctor 6 provided on a center roll (press roll) 5, and is led into a broke pulper (not shown) by means of a broke shoot. In this instance, the wet paper web is carried up to the center roll in the form of a sheet having slitted at the positions of a tail width by means of paper cutting nozzles 2 and trimmed by means of trimming nozzles 1 as shown in Fig. 2.

Subsequently, while a No. 1 suction transfer roll 7' having an inner space divided into a tail zone and a total-width zone is lightly pressed against the center roll, vacuum is acted upon the tail zone. At the same time, a No. 2 suction transfer roll 8' having an inner space divided into a tail zone and a total-width zone is also lightly pressed against a 4P top roll 9, and vacuum is acted upon the tail zone. In succession, the tail portion is cut in the widthwise direction from the slit formed by the trimming nozzle 1 up to the slit formed by the paper cutting nozzle 2 as shown by a tail cut line in Fig. 2 by actuating the tail cutting nozzle 3 on the wire part. When the cut portion has passed a No. 3 press and has passed a nip between a center roll 5 and a No. 1 suction transfer roll 7', due to a vacuum force acted upon a tail portion of this tail, the tail is transferred from the tip end portion of the tail cut in the widthwise direction to the No. 1 suction transfer roll 7'. At this moment, an air-jet nozzle 14 could be used for assisting the transfer of the tail to the No. 1 suction transfer roll 7'.

When the tail has passed a nip portion of a No. 4 press, it is caught by the 4P top roll 9 and passes the nip between the roll 9 and the No. 2 suction transfer roll 8'. At this moment, similarly to the No. 1 suction transfer roll 7', the tip end of the tail is transferred to a No. 2 suction transfer roll 8' by a vacuum action upon the tail portion, and is threaded through a dryer part. At this time, an air-jet nozzle 15 could be used for assisting the transfer of the tail to the No. 2 suction transfer roll 8'. A 4P top roll doctor 10 is used with a relatively low nip pressure for removing paper dregs or the like adhered to the 4P top roll.

When threading of a tail of a wet paper web through a dryer has been completed in the above-described manner, the paper cutting nozzle 2 in the wire part is moved to broaden a tail width of the wet paper web up to the total width. At the same time, the vacuum zones in the above-described suction transfer rolls 7' and 8' are switched to a total-width zone. Thereby, threading of a wet paper web having a total width is automatically completed.

Fig. 3 shows another preferred embodiment, in which transfer of a tail in the transfer roll portion can be achieved more reliably. In Fig. 3, a center roll blanket 12 and a 4P top roll blanket 13 are wound respectively around the center roll 5 and

around the 4P top roll 9, and by making these blanket somewhat overlap respectively with the No. 1 suction transfer roll 7' and the No. 2 suction transfer roll 8', the sheet transfer at these portions is made to be reliable. In this modified case, the respective transfer suction rolls 7' and 8' are not pressed lightly against the center roll 5 nor against the 4P top roll 9, and so, a wet paper web can be transferred from the blankets 12 and 13 without forming an open draw.

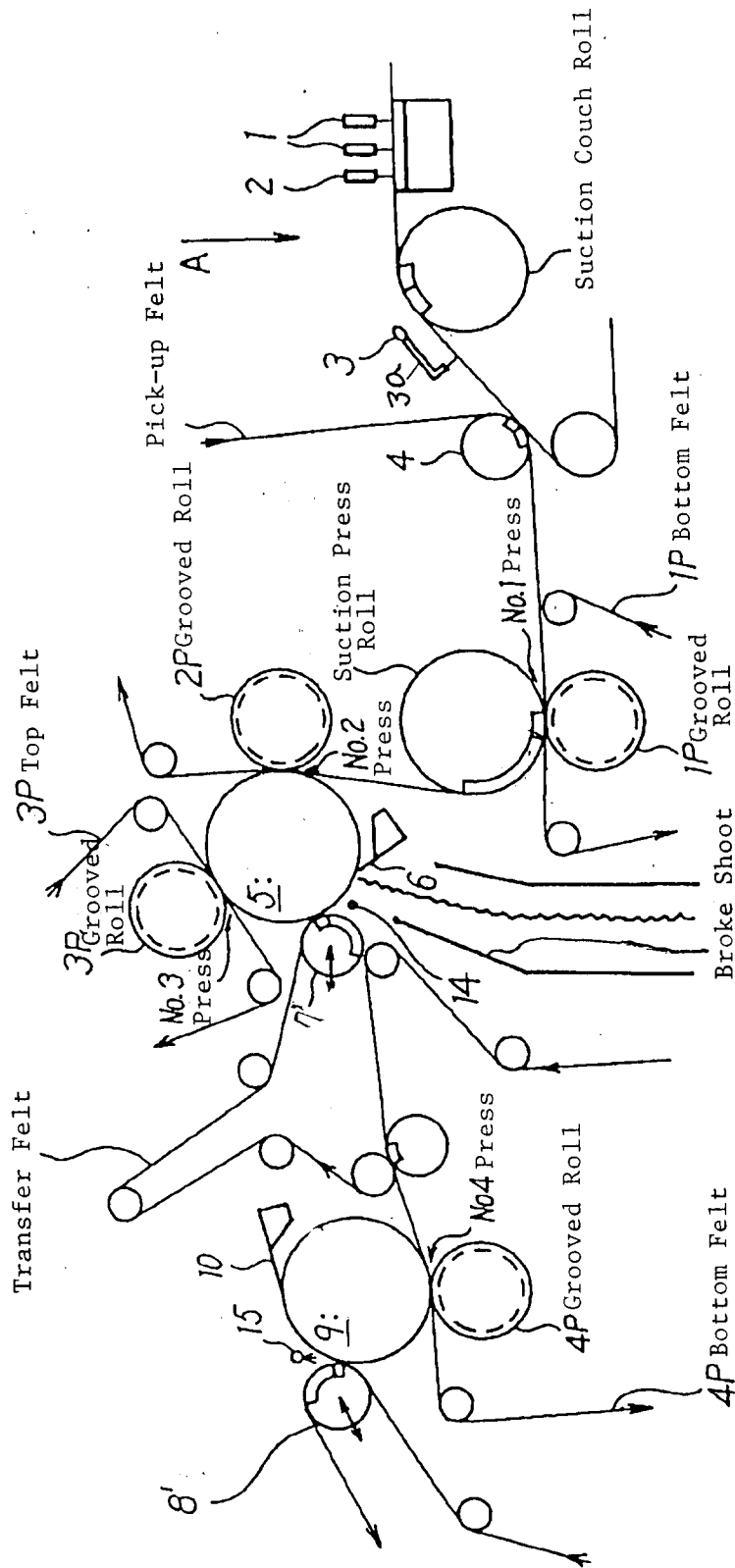
While the method of paper threading operation for a tail is similar to the embodiment shown in Figs. 1 and 2, the center roll doctor 6 is not provided, but a wet paper web before threading would travel jointly with the center roll blanket 12, and it could be made to fall into a broke pulper or paper threading for a tail portion could be effected in a similar manner to the above-described first preferred embodiment. It is to be noted that the tail cutting device could be disposed either in a wire part or in a press part, and the cutting means could not be a water jet but could be any other means.

While a principle of the present invention has been described above in connection to preferred embodiments of the invention, it is intended that all matter contained in the above description and illustrated in the accompanying drawings shall be interpreted to be illustrative and not in a limiting sense.

Claims

1. A press part paper threading system in a paper machine, characterized in comprising at least one set of suction transfer rolls having an inner vacuum zone divided into a tail zone and a total-width zone, capable of switching the same vacuum zones, and capable of lightly pressing against a press roll and releasing the pressing, and a tail cutting device for cutting a tail for threading, in the widthwise direction.
2. A press part paper threading system as claimed in Claim 1, characterized in comprising an air-jet nozzle for assisting to scrape out a paper web from a center roll and a top roll.
3. A press part paper threading system in a paper machine, characterized in comprising at least one set of suction transfer roll having an inner vacuum zone divided into a tail zone and a total-width zone capable of being switched and cooperating with a press roll, and a tail cutting device for cutting a tail for threading in the widthwise direction, said press roll being equipped with a blanket around its circumference.

Fig. 1



Wire Part

Press Part

Fig. 2

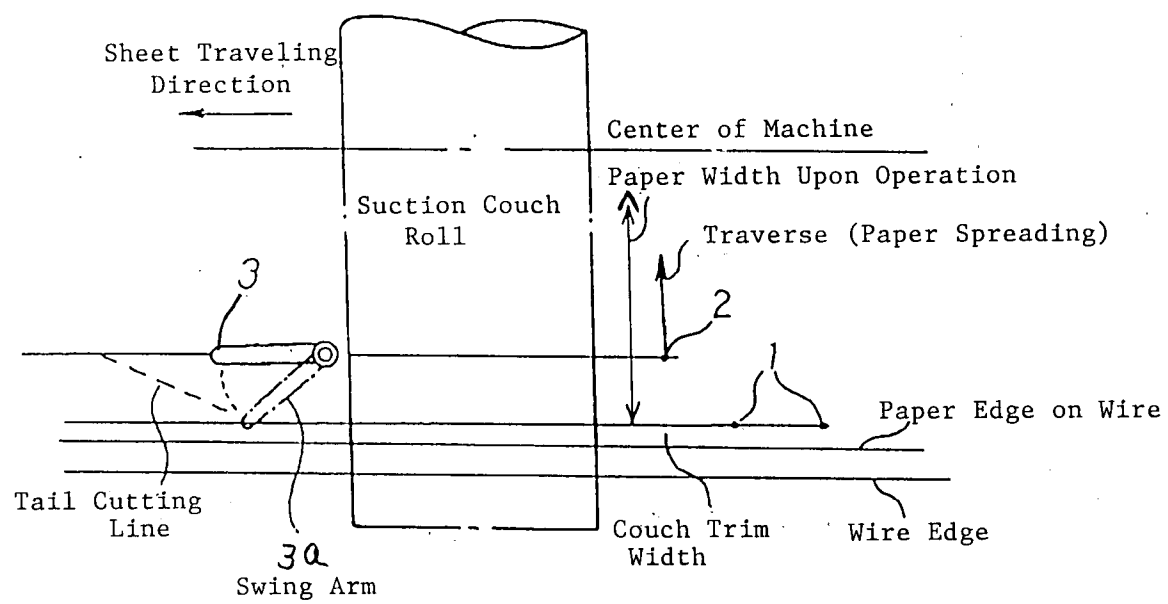


Fig. 3

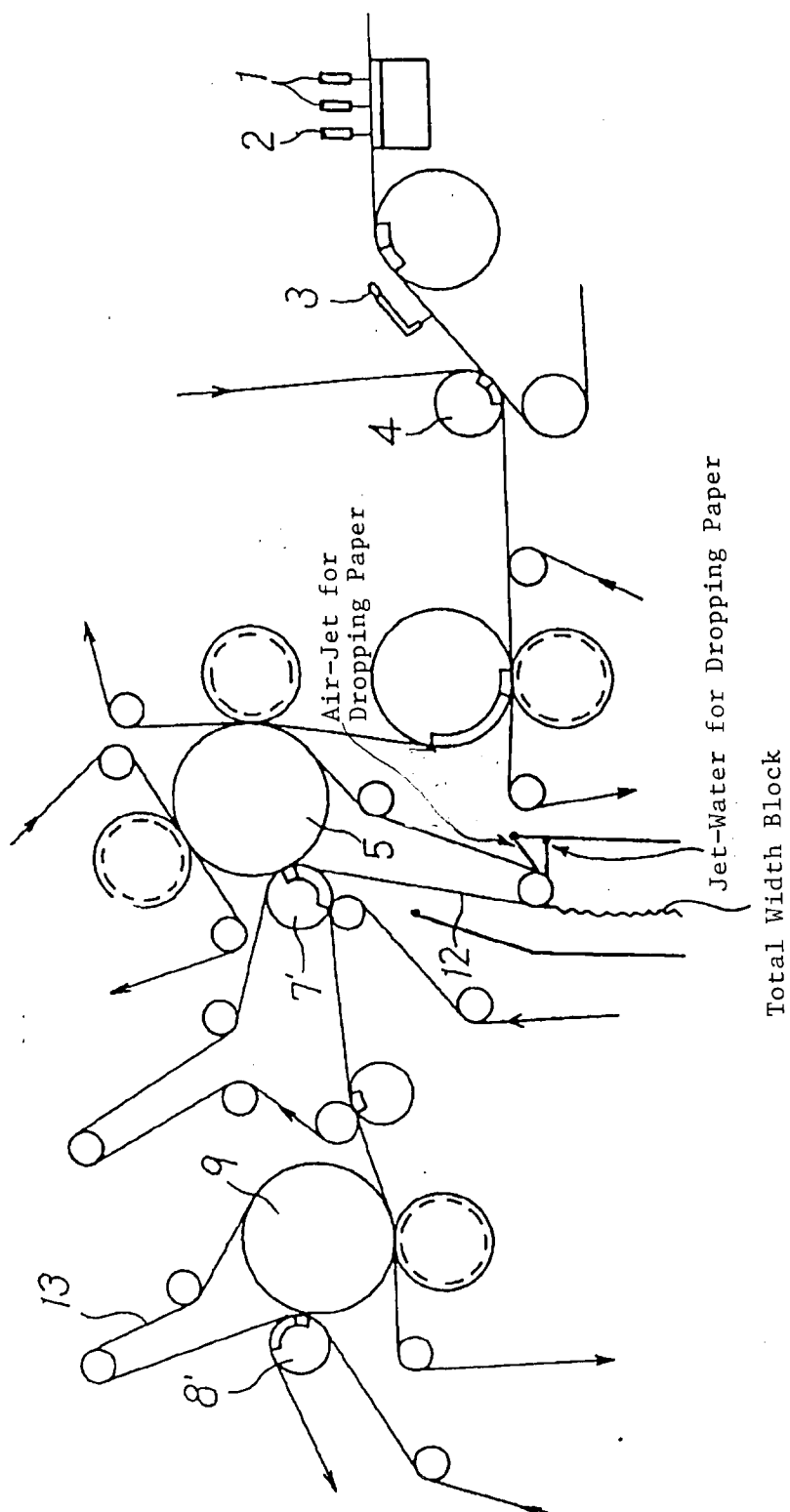
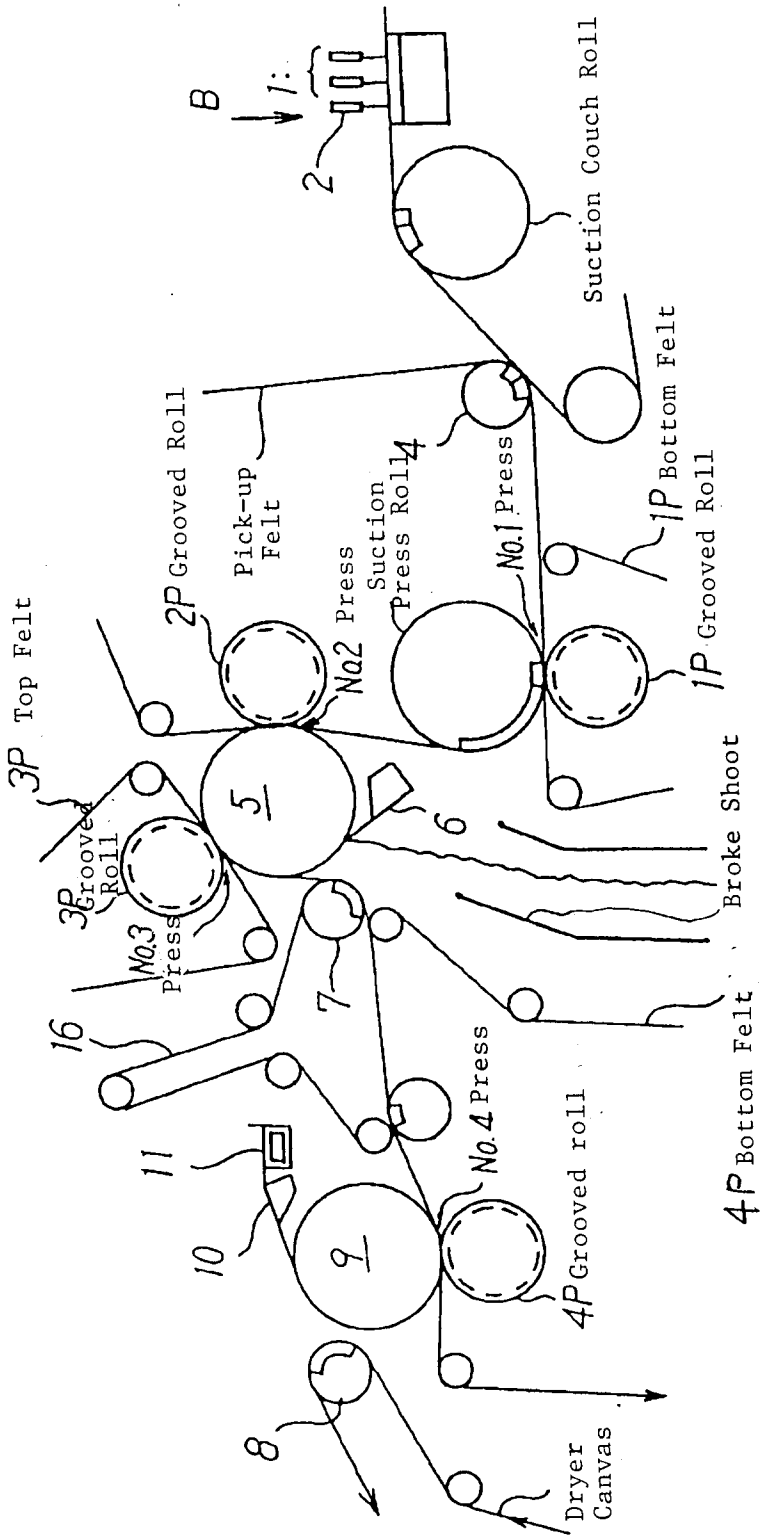


Fig. 4

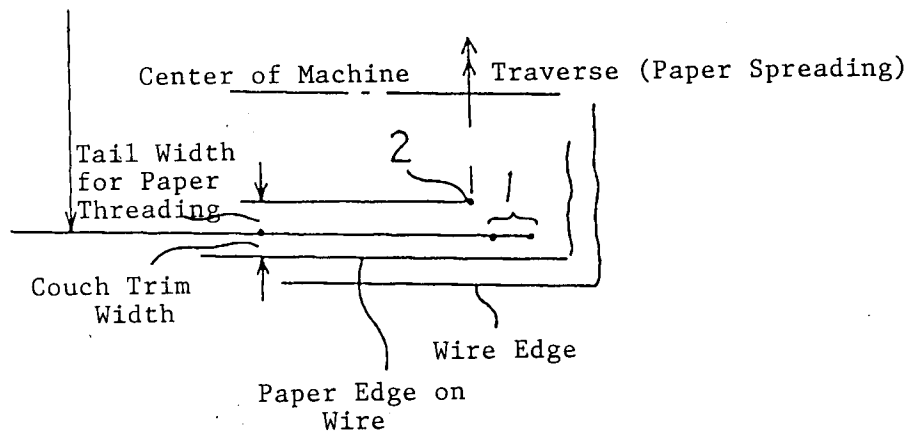


Press Part

Wire Part

Fig. 5

Paper Width Transferred
to Press Part
at Normal Time





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EUROPEAN SEARCH REPORT

Application Number
EP 93 11 0451

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	US-A-5 037 509 (WEDEL)	1,2	D21G9/00
A	* the whole document *	3	D21F3/04
A	DE-U-90 11 461 (VOITH)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			D21G D21F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		23 November 1993	DE RIJCK, F
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