

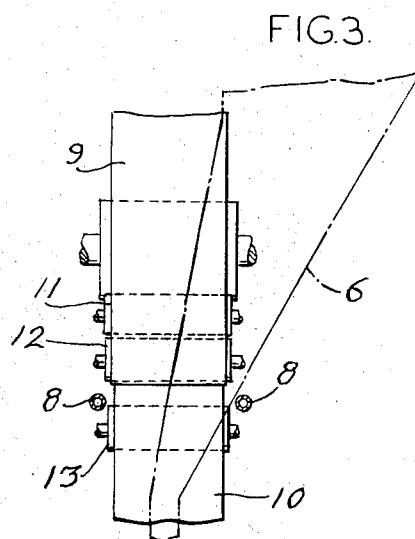
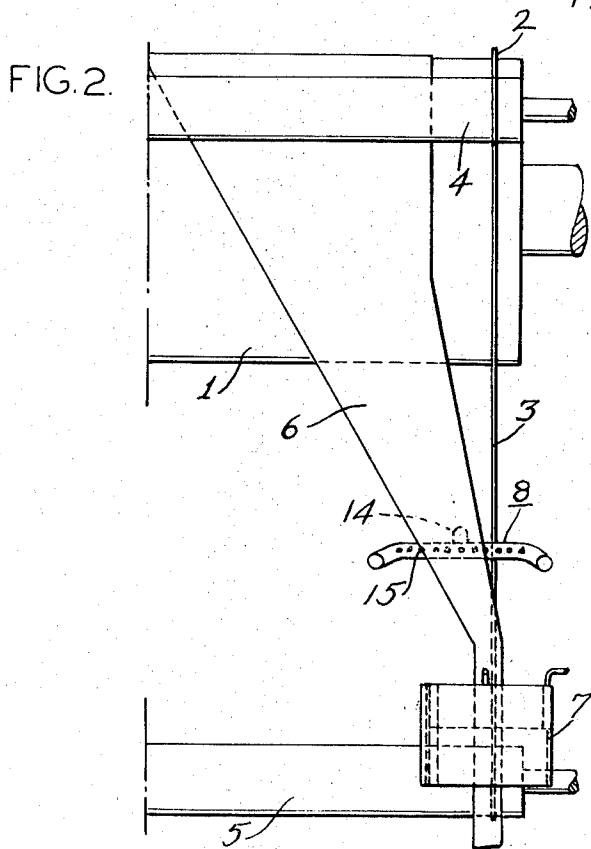
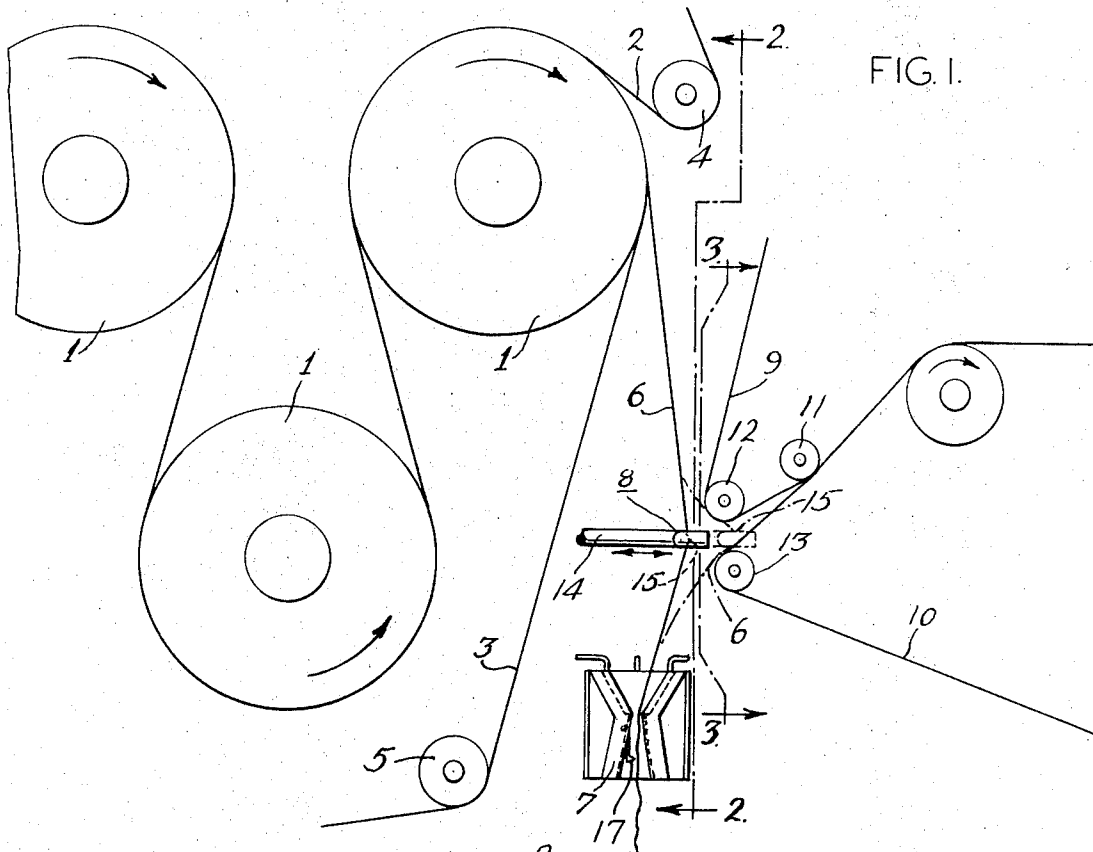
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METHOD AND A DEVICE FOR THREADING

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1

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METHOD AND A DEVICE FOR THREADING
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5 Claims

ABSTRACT OF THE DISCLOSURE

For transferring a leading strip of web material from a leading strip conveyor of a cylinder dryer to the leading strip conveyor of a fan dryer, comprising a suction device underlying the discharge from the first leading strip conveyor to slightly tension the leading strip which falls from the discharge, a deflector guide to displace the leading strip into registry with the inlet of the second conveyor, said guide including blowing means to blow a portion of the strip into the inlet of the second conveyor, and a severing device to cut off the leading end of the strip which is beyond the portion caught by the second conveyor.

The present invention relates to a method and a device adapted in the threading of a web through a treating apparatus for transferring the leading strip from a first leading strip conveyor to a second leading strip conveyor disposed after the first conveyor.

In mechanical paper-making it is known since long to dry the wet paper web in a cylinder dryer comprising a plurality of cylinders arranged in two rows one above the other, about which cylinders the paper web is caused to run in a serpentine path. For being able to thread the web through the cylinder dryer, the front end of the web is given the shape of a narrow strip located at one side of the machine. Said strip, the so-called leading strip, is introduced between two endless ropes, which together run the way over the cylinders and the paper web is to be threaded, and which between themselves clamp and take along the leading strip. At the discharge end of the machine the ropes are so separated, that the leading strip is disengaged therefrom. During the threading only the foremost portion of the leading strip is in engagement with the ropes. The remaining part of the leading strip rests upon the cylinders. The ropes are guided by and supported in a groove provided at one end of every cylinder. The ropes are driven by the rotating cylinders. Upon the disengagement of the front portion of the leading strip from the ropes, also the leading strip is driven by the cylinders, due to its contact with the same. When the leading strip has been threaded through the entire machine, the strip width is so increased that it finally covers the entire width of the paper web. Thereby the threading is completed, and the paper machine is in operation.

Recently, however, paper machines have been constructed in which the paper web only partially is dried in a cylinder dryer, the remaining part of the drying being carried out in a fan dryer by blowing hot air against the web. In the fan dryer the paper is advanced in coils running vertically upwards and downwards, or in straight reciprocating passages. For several reasons it is not suitable to use two ropes as leading strip conveyors in a fan dryer, i.e. because in the long straight passages there will be

2

no contact force between the two ropes and, thus, the ropes cannot retain the leading strip in a satisfactorily safe way. Irrespective of the type of leading strip conveyor being used in a fan dryer, it is however, difficult from a constructional aspect to place the leading strip conveyor as close to the paper web as in a cylinder drier where the groove for the ropes can be placed at a distance less than 100 mm. from the nominal edge of the paper web. For the threading through a paper machine comprising both cylinder dryer and fan dryer it is, therefore, necessary to transfer the leading strip from a first leading strip conveyor to a second leading strip conveyor of a different design than the first conveyor and placed in staggered relationship thereto.

The invention solves this problem. When the front end of the leading strip has passed the first leading strip conveyor, the leading strip is allowed to fall freely down onto the floor of the machine room. The leading strip thereby leaves its engagement with the ropes and stabilizes in a path through the cylinder dryer which is located slightly inside of the first leading strip conveyor and from the last cylinder in the cylinder dryer runs in a free fall to the machine room floor. When a solid object is being moved from the side against the falling leading strip, the strip immediately clings to the object, because the strip still is somewhat wet and tends to adhere to solid surfaces. For being able by guide surfaces to displace the running leading strip laterally outwards against the second leading strip conveyor and into engagement therewith, the leading strip must be pulled forward by a force exceeding the force of its own weight. By effecting such a force by means of a separate drawing means it is gained, that a guide means can be placed in abutment to the running leading strip above the drawing means, and the leading strip by the guide means can be guided to the desired path.

When the leading strip runs in a path past the inlet point of the second leading strip conveyor, a short and strong compressed air jet is sent against the leading strip in the direction to the inlet point of the conveyor, whereby the leading strip is so curved outwardly that the conveyor catches the strip. Approximately simultaneously the leading strip is cut off in a point below the inlet point, in order to prevent that portion of the leading strip which already has fallen down onto the machine room floor to be pulled into the second leading strip conveyor.

By the invention it is achieved, that the leading strip in a smooth and safe way can be transferred from the first leading strip conveyor to the second one. The only hitherto existing alternative to the invention is a transfer by hand which is highly fortuitious and dangerous, because the person trying to make the transfer always risks to be caught by the second leading strip conveyor and be pulled into the same.

The invention will now be described in greater detail, with reference to the accompanying drawing wherein:

FIG. 1 is a diagram showing the transfer of the leading strip from the first leading strip conveyor to the second leading strip conveyor; and

FIGS. 2 and 3 are views taken on the lines 2—2 and 3—3 respectively of FIG. 1.

In the cylinder drying part for paper, over the cylinders 1 two ropes 2 and 3 are guided in a groove, which is provided close to one end of the cylinders 1. The ropes clamp between themselves a narrow strip of paper web, the so-called leading strip. Subsequent to their running over the last cylinder 1, the ropes 2 and 3 are separated

3

by being directed over pulleys 4 and 5 respectively. Thereby the leading strip 6 is disengaged and falls down onto the machine room floor. Upon the introduction of the leading strip 6 between the ropes 2 and 3 in the first leading strip conveyor, only the front portion of the leading strip is allowed to be clamped between the cables, the remaining part of the leading strip resting farther inwardly on the cylinders. Therefore, when the front end of the leading strip has reached the last cylinder 1 and has fallen down onto the machine room floor, the remaining part of the leading strip will run 200-400 mm. inside of the plane of the ropes 2 and 3. As the second leading strip conveyor usually is located in a plane 100-200 mm. outside of the plane of the ropes, the falling leading strip is required to be displaced laterally 300-600 mm. for coming into engagement with the second leading strip conveyor. The only tensile stress to which the falling leading strip is subjected during its fall, is caused by the weight of that part of the leading strip which is suspended below, i.e. the part which has not yet reached the floor. This stress is not sufficient to render possible a guiding of the leading strip. When trying this method, the leading strip adheres to the guiding surfaces and clings thereto. For being able, in spite thereof, to establish a guiding of the kind described, a drawing means 7 is provided to catch the falling part of the leading strip 6 and apply thereto a slight tensile stress, which is sufficiently great for allowing the path of the leading strip to be guided by a guide means 8 provided with guide surfaces. By the guide means 8 the leading strip can be moved in a path suitable for engagement with the second leading strip conveyor, which in the embodiment shown comprises two belts 9 and 10 so deflected via a pulley 11 that they abut to each other for pressing between themselves and advance the front end of the leading strip. Prior to their running over the common pulley 11, each of the belts is deflected over its pulley 12 and 13 respectively, in such a manner, that they on towards the pulley 11 form a wedge, which terminates in a so-called belt nip at the pulley 11 where the belts meet.

When the leading strip 6 by the guide means 8 has been caused to run in a path in front of the pulleys 12 and 13, the strip can be forced to curve into the wedge between the belts 9 and 10 by subjecting it to a compressed air jet from a blow device, in such a manner, that the leading strip is caught and taken along by the belts. In the embodiment shown in the drawing the blow device is combined with the guide means, to which compressed air is supplied through the hose connection 14 and blown out through openings in the guide surface at 15. The blow device, however, may be a separate nozzle mounted either movably or stationary straight in front of the belt wedge, the stationary mounting being most suitable.

Substantially at the same time when the leading strip 6 is being blown into the belt wedge, its suspending portion, i.e., the portion located below the belt wedge, shall be cut off or separated for preventing a double feed of the leading strip between the belts, in which case also that portion thereof which already has fallen down onto the machine room floor would be pulled into the subsequent drying section where it possibly gets caught and blocks the passage. For its separating in a most simple way the leading strip 6 is locked in the drawing means 7, so that it will be torn off somewhere between the pulley 11 and the drawing means 7. If the locking in the drawing means is effected by a sharp edge, which presses the leading strip against a surface, as indicated at 17 in FIG. 1, the edge makes a fractural impression, with the result that the strip is torn off at this impression. It also is possible to cut off the leading strip by a shears mounted within or outside of the drawing means.

Briefly, a threading operation proceeds as follows. At the wet part of the paper making machine a narrow strip is sprayed off from the remaining web. Said strip, the so-

4

called leading strip, is introduced between the ropes 2 and 3 in a rope conveyor, by which it is pulled through the cylinder dryer. At the last cylinder of the cylinder dryer the ropes are separated, and the front end portion of the leading strip falls onto the floor. The leading strip stabilizes to run in a path over the cylinders which is located 200-400 mm. on the inside in front of the ropes 2 and 3, and after the last cylinder it "flows" down in a free fall onto the machine room floor. The falling part of the leading strip is caught by the drawing means 7, which imparts to said part a slight tensile stress. A guide means 8 is so controlled to catch the leading strip in the inner corner between two angular legs, by which guide means the leading strip is moved to the side and forwards so as to run downwards directly in front of and close to the belts 9 and 10. A short and strong compressed air jet is directed from behind against the leading strip, which thereby is blown into the belt wedge where it is clamped between the belts in the belt nip and follows with the belts into and through the fan dryer. Simultaneously the leading strip is clamped at 17 in the drawing means and torn off above the same.

The invention can be applied, besides for paper drying, in the drying, for example, of paper pulp or in the treatment of other materials, which are adapted to be advanced by conveyors of the type here discussed, or which involve problems similar to those described above. The invention, of course, is applicable to a high degree also in such cases where the leading strip is to be transferred between two leading strip conveyors running in the same vertical plane, in which case no lateral displacement is to be made. Also in such cases it may be desirable to guide the leading strip in front of the inlet point of the subsequent leading strip conveyor.

The invention renders it possible, provided that the guide means is constructed in a suitable way, to transfer the leading strip even when the inlet point of the second leading strip conveyor is located higher than the outlet point of the first leading strip conveyor. In that case the leading strip must be lifted by the guide means to the second leading strip conveyor.

We claim:

1. In threading a web through a treating apparatus, a method of transferring the leading strip from a first leading strip conveyor to a second leading strip conveyor disposed after the first conveyor, comprising the steps of allowing the leading strip after its passage through the first leading strip conveyor to run downwards in a free fall, causing a drawing means to act upon the leading strip during its fall to impart a slight tensile stress to the leading strip, and bringing guide means against the leading strip in front of the drawing means for guiding the leading strip in a suitable path prior to its engagement with the second leading strip conveyor.

2. A method according to claim 1 including the step of moving the leading strip by the guide means past the inlet point of the second leading strip conveyor, and blowing the strip into the inlet of the second leading strip conveyor.

3. A method according to claim 2 including the step of separating the leading strip portion which has already run past the inlet point of the leading strip conveyor.

4. Apparatus for transferring the leading strip from the discharge of the first leading strip conveyor to the inlet of a second leading strip conveyor disposed after the first conveyor, the inlet of the second conveyor being offset from the vertical plane of the discharge of the first conveyor, means for drawing the leading strip from the discharge of the first conveyor to impart a slight tensile stress thereto, guide means in advance of said drawing means for displacing the strip into registry with the inlet of the second conveyor, and blow means for blowing the strip into the inlet of the second conveyor.

5. Apparatus according to claim 4 wherein said blow means comprise discharge openings in said guide means

and means connecting said discharge openings to a pressure medium source.

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5