

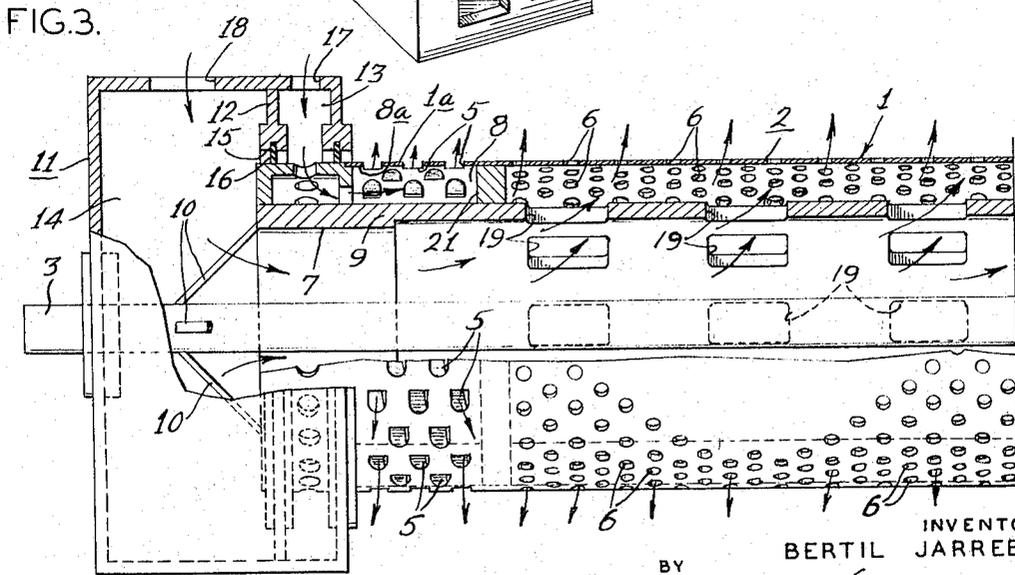
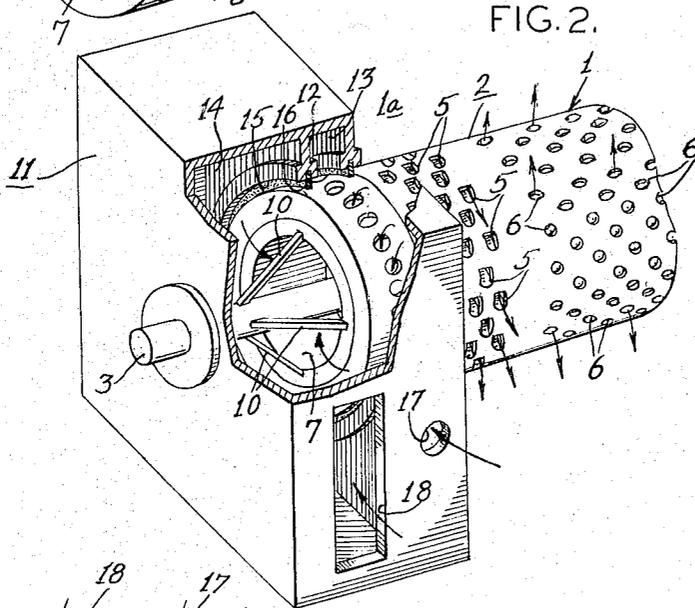
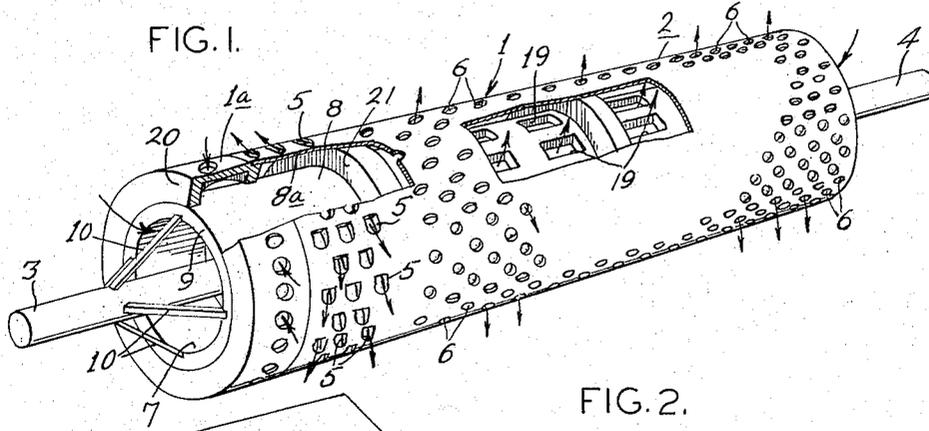
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WEB TURNING DEVICE

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WEB TURNING DEVICE

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The present invention relates to a web turning device for a web-like material and more particularly to a device for use in paper and cellulose dryers or similar treatment plants, wherein a web-like material is advanced in a number of passages having horizontal and/or vertical turns and is transmitted by means of the turning device from one passage to another. In the present instance the turning device comprises a cylinder having two axle spindles supported by stationary bearings. The web turning device in a well known manner is divided into two separate spaces with a perforated mantle surface and including means for the supply of a gaseous medium to the interior of said device.

When drying or otherwise treating webs of, for example cellulose, paper or fabric it is known in order to save space, to conduct the web in zig-zag manner through a treatment plant. Even if the web is carried by means of a series of endless transporting means or is advanced air-borne i.e. by means of a medium being blown towards the under-side of the web, there is a need for turning devices for transmitting the web from one transporting plane to another. In order to facilitate the transmitting of the web from one transport plane to another during the threading of the web, it is known to perforate the turning device and put it under vacuum so that the web is sucked to the device and thus adheres to it as it turns. Experience has proved that by using a device of this design in instances where the treatment relates to thin, flimsy webs for instance paper, to an unsuitable stretching strain results. To eliminate this drawback air is supplied to the turning device, which air is discharged through the perforations to create a friction diminishing air film between the device and the web. A primary object of the invention is to make use of the last mentioned arrangement by providing improvements in such web turning devices to permit automatic turning of the web during the threading of same.

The invention is characterized in that the two spaces of the device are located longitudinally of the web turning device, the perforations at one end of the device having depressed eye-lid shaped apertures to cause the supplied medium to flow out in a tangential direction coincident with the rotational direction of the web turning device. These perforations lead to one of the above mentioned spaces located between the surface and a tube inserted in the web turning device and having a diameter smaller than that of the device. In addition means are provided for the supply of gaseous medium to the limited space and having a higher pressure than that of the medium being supplied to the other space of the web turning device. The part of the device equipped with eye-lid shaped apertures is located so that the web during normal running (during its transport) does not come in contact with this part of the device, while during threading, the long narrow end (the tail) of the web being advanced at the side of the proper transport plane, passes the web turning device above the eye-lid perforated part. The transport of the end (the tail) of the web may suitably take place by means of the arrangement disclosed in the U.S. patent to Wallin, Number 3,206,092, issued on September 14, 1965.

According to a suitable embodiment of the invention,

the end of the device which is perforated with eye-lid shaped apertures projects into a stationary chamber surrounding the projecting portion and providing a seal therefor. The chamber, by means of a partition, is divided into a high pressure chamber communicating with the closed space provided with eye-lid shaped apertures, and a low-pressure chamber communicating with the remaining part of the device by means of a cylindrical, ported tube. The tube is inserted into the device and projects into the chamber past the above mentioned perforated end of the device thereby providing communication with the low-pressure chamber by an opening having a packing ring and located in the partition of the chamber. The part of the turning device being provided with low-pressure medium may be perforated with relatively small round holes or may be provided with eye-lid shaped apertures.

Other objects and a fuller understanding of the invention may be had by referring to the following specification and claims taken in conjunction with the accompanying drawing in which:

FIG. 1 is a fragmentary perspective view of a portion of a web turning device constructed in accordance with the present invention;

FIG. 2 shows a fragmentary perspective view of the above illustrated web turning device connected to a chamber for the supply of gaseous medium thereto, with a portion of the chamber broken away; and

FIG. 3 is an enlarged sectional view of the apparatus illustrated in FIG. 2.

In the drawing a web turning device 1 comprising a foraminous hollow cylinder 2 is supported by two spindles 3 and 4 having connecting spiders 10 and mounted in stationary bearings (not shown). In accordance with the invention the web turning device 1 is provided, at a threading end 1a of the cylinder 2, with perforations, in the present instance depressed eye-lid shaped apertures 5. The remaining surface of the device is provided with a plurality of medium discharge openings in the form of small, round holes 6. The depressed eye-lid shaped apertures 5 communicate with a space 8 separated from the hollow central portion 7 of the turning device. The radial boundaries of the space are defined between the interior surface 8a of the cylinder 2 and a tube 9 coaxially mounted therein, while a pair of spaced annular end walls 20 and 21 define the axial boundaries of the space 8.

A chamber 11 surrounds a portion of the end 1a and by means of an annular partition 12, is divided into a high-pressure portion 13 communicating with the space 8 and a low-pressure portion 14, communicating with the interior 7 of the cylinder 2. The tube 9 inserted in the turning device is arranged to project into the low-pressure portion 14 thus providing communication with the interior 7 of the cylinder. An opening 15 provided with an annular packing ring 16 is mounted in the partition 12 and seals the low-pressure chamber 14, from the high-pressure chamber 13. The high-pressure medium is supplied to the high-pressure chamber 13 through an opening 17 while the low-pressure medium is supplied to the chamber 14 through an opening 18. In order to insure an even distribution of the supplied medium, the tube 9 may be extended along the whole length of the cylinder while being provided with medium distributing openings 19 in the low pressure portion of the device.

What is claimed is:

1. A turning device for web-like material, comprising in combination a foraminous rotatable, hollow cylinder having at least one spindle supporting said cylinder, a tube mounted within said cylinder and spaced from the inner surface of said cylinder so as to define a longitudinal space extending therebetween, at least one annular

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wall circumscribing said tube and connecting said tube to the inner surface of said cylinder so as to divide said space longitudinally into a first and a second chamber, said cylinder surface associated with said first chamber having a plurality of means each defining an opening, said cylinder surface associated with said second chamber having a plurality of holes therein, said openings positioned to cause a flow of a medium therethrough in a direction substantially tangential to the surface of said cylinder and in a direction coincident with the direction of intended motion of said cylinder, said tube having a plurality of slots confined to the portion of said tube associated with said second chamber, means for supplying a low pressure gaseous medium into said tube through said slots, and means for supplying a higher pressure medium to said first chamber.

2. A turning device in accordance with claim 1 wherein at least some of said openings comprise eye-lid shaped apertures, and said first chamber is positioned at one end of said cylinder.

3. A turning device in accordance with claim 2 including a stationary chamber positioned at said one end of said cylinder and enclosing a portion of said one end airtightly, and a partition airtightly circumscribing said cylinder and mounted within said stationary chamber to form a high pressure chamber interiorly of said stationary chamber and circumscribing said portion.

4. A turning device in accordance with claim 1 wherein at least some of said holes are eye-lid shaped apertures.

5. A turning device for web-like material, said device intended to be used in paper and cellulose dryers or simi-

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lar treatment plants wherein the web-like material is advanced in a number of passages with horizontal or vertical turns and is transmitted by means of said turning device from one passage to another; said turning device comprising a cylinder having a pair of spindle parts adapted to be supported by stationary bearings, said cylinder, in a manner known per se, being divided into at least two separate chambers with a perforated cylindrical wall and with means for the supply of a gaseous medium to the interior of said cylinder, said chambers of the cylinder being located one after the other reckoned axially thereof; the perforations of said cylinder at one end thereof being in the form of the pressed eye-lid shaped apertures to cause the supplied medium to flow out in a tangential direction coincident with the moving direction of said cylinder, said apertures leading to one of said chambers located between said surface of said cylinder and a tube inserted in said cylinder, said tube having a smaller diameter than said cylinder, and means for the supply of a high pressure gaseous medium to said one chamber and means for the supply of a lower pressure gaseous medium to said other chamber of said cylinder.

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