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(54) **DISPOSITIF DE COMPRESSION ET DE TIRAGE D'UNE BANDE CONTINUE DE FILM SOUFFLE PLASTIQUE PRODUIT PAR SOUFFLAGE-EXTRUSION**

(54) **COLLAPSING AND TAKE OFF DEVICE FOR A PLASTIC BLOWN FILM WEB PRODUCED IN THE BLOWN FILM EXTRUSION PROCESS**

(57) A collapsing and take off device for a plastic blown film web, which is produced by a stationary blown film die in the blown film extrusion process, includes collapsing boards and pinch rolls, which can be pivoted so as to reverse around the axis of the delivered film tube. The collapsed blown film web is guided from the pinch rolls over a stationary deflecting roller, an external deflecting roller and an internal reversing rod to a wind up unit. The reversing rod comprises a perforated pipe, around which the blown film is looped, which is attached to a blower. To take off the blown film web with essentially identical air lubrication by means of the reversing rod, the air flow to the perforated pipe is controlled so that, independently of the area of the reversing rod perforations that is covered by the blown film web, the blowing air issues from the perforations at approximately the same pressure.

1222-25

Abstract

A collapsing and take off device for a plastic blown film web, which is produced by a stationary blown film die in the blown film extrusion process, includes collapsing boards and pinch rolls, which can be pivoted so as to reverse around the axis of the delivered film tube. The collapsed blown film web is guided from the pinch rolls over a stationary deflecting roller, an external deflecting roller and an internal reversing rod to a wind up unit. The reversing rod comprises a perforated pipe, around which the blown film is looped, which is attached to a blower. To take off the blown film web with essentially identical air lubrication by means of the reversing rod, the air flow to the perforated pipe is controlled so that, independently of the area of the reversing rod perforations that is covered by the blown film web, the blowing air issues from the perforations at approximately the same pressure.

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Collapsing and Take Off Device for a Plastic Blown Film Web Produced in the Blown Film Extrusion Process

The invention relates to a collapsing and take off device for a plastic blown film web, which is produced by a stationary blown film die in the blown film extrusion process and whose collapsing boards and pinch rolls can be pivoted so as to reverse around the axis of the delivered film tube. The blown film web is guided between the reversing collapsing boards and the pinch rolls, on the one hand, and a stationary deflecting roller, on the other hand, over an outer deflecting roller and an inner reversing rod, both of which are pivotally mounted in the plane parallel to the pivot plane of the pinch rolls. The reversing rod comprises a perforated pipe, around which the blown film is looped, which is attached to a blower.

This type of collapsing and take off device is disclosed, for example, in DE 21 56 079 C2. When the blown film web is pulled off using the reversing rod, the diagonal center plane of the reversing rod is always on the angle bisector between the ascending and descending strand of the blown film web. Hence, when the blown film web is taken off via the reversing rod, it assumes angles ranging from 90° to an acute angle, for example 30° in the embodiment according to DE 21 56 079 C2. The result of this angular position of the blown film web relative to the reversing rod is that the degree to which the blown film web covers the perforations in the reversing rod pipe is the smallest is when the web is pulled off at a right angle using the turning rod, and is the largest when it is pulled off diagonally. In the prior art collapsing and take off device, however, the air pressure in the reversing rod fluctuates as a function of the

blown film web's degree of coverage, because, in the one case, the blown film web covers only some of the perforations in the pipe and, in the other case, most of the perforations are covered. Since in the prior art design the blower only delivers a constant amount of blowing air to the reversing rod, the air pressure is too small for the minimum coverage so that the blown film web makes an undesired contact with the reversing rod, thus increasing friction, whereas in the case of maximum coverage, thus diagonal take off, the air pressure can increase so much that the blown film web is virtually lifted off the reversing rod in an undesired manner.

This invention seeks to improve this prior art device so that the blown film web is always drawn off over the reversing rod with essentially constant air lubrication.

This invention provides a controller, or regulator, so that, independently of the proportion of perforated pipe surface area that is covered by the blown film web, the blowing air issues from the covered perforations at approximately the same pressure. The device of the invention guarantees that independently of the angle at which the blown film web is pulled off over the reversing rod, the blown film web always slides on an essentially constant air cushion and thus is carried with essentially the same air lubrication. This avoids both frictional contact between the blown film web and the reversing rod, and the presence of too much air between the blown film web and the reversing rod.

In a first embodiment of this invention, a controller is provided that controls the blowing air supply in proportion to the angular position of the reversing rod. Such a controller can

be designed with relatively simple means, for example slider or flap controls.

In another embodiment of this invention, a controller and a meter are provided, which measure the air pressure in the reversing rod. Based on the signals derived from the meter, the controller holds the air pressure in the reversing rod at an essentially constant value irrespective of the angular position of the reversing rod.

One embodiment of the invention is explained in detail below with reference to the Figures, in which:-

Figure 1 is a diagrammatic simplified side view of the reversing device in its normal position; and

Figures 2 and 3 are simplified top views of the position of the deflecting mechanisms in the normal position (Figure 2) and at maximum deflection (Figure 3).

A blown film tube 1, moulded by an extruder with a blown film die, is collapsed by collapsing boards 2, which are fastened to an auxiliary frame 3, which in turn is pivotally mounted in a main frame 6 by means of a traverse 4 and a bearing axle 5. The main frame 6 is set up, for example, with posts 7 on a take off stage 8 with passage opening 9. The collapsing unit 2, 3, 4, 5 is rotated using a drive motor 10, which is shown schematically, while an electric stationary limit switch reverses, for example, after a 270° angle of rotation. The collapsed film is deflected sideways in the shape of an S around take off and pinch rollers 11 and 12 and carried to a deflecting roller 13, which also reverses in the same direction and which is fastened to the auxiliary frame 3 by means of a support 13'. It has been demonstrated that by enveloping the rollers 11, 12 in the shape

of an S the film tube can be adequately pinched so that no air can escape from the film tube 1. The blown film web next passes over a reversing rod 14, which is pivotally mounted on the side of the carrying axle 5, by a support 15 and a bearing sleeve 16. All of these deflecting elements are arranged tangentially to the imaginary circles around the center axis of the carrying axle 5. Following the reversing rod 14 there is a stationary pair of forward draw rolls 23, 24 and then a winding unit (not illustrated).

As shown in Figures 2 and 3, the reversing rod 14 is always put into the "bisectoral position" by the ascending and descending strand and hence brings about the deflection of the web, which is fed in over an angular area of about 270^0, in a uniform direction. The reversing rod can be moved freely and automatically puts itself in the correct position owing to the web tension or it is forced into the correct position as shown in Figure 1. The axis of swivel for the reversing rod 14 must always be (even if less than 180^0 of the reversing rod is enveloped) at the intersection (seen in the ground plan) of the film central axis of the blown film web strand ascending and descending the reversing rod, since otherwise during the swivelling motion of the system the film web would travel sideways. Since during its swivelling motion the reversing rod moves around the intersection of the central axis of the film, the result is virtually no change in the course of travel of the blown film web when the system is swivelling. The result is that the pair of forward draw rollers can be mounted especially advantageously and stationarily on the outflow side of the device and the related current and control line can be installed in a fixed location. The small length differences between the straight and inclined looping around the reversing rods are

virtually insignificant. Half of the enveloped circumference of the reversing rod pipe, is perforated, and the pipe interior is attached to a blower so that the web glides off the reversing rod on an air cushion.

To this extent the device of the invention is equivalent to the collapsing and take off device disclosed in DE 21 56 079 C2, to which reference is made with respect to the following description. One end of the perforated reversing rod pipe 14 is closed, while the other side is attached to the tube 25, feeding in the compressed air from the blower 26. If desired, both ends can be provided with attachments for the compressed air supply.

The varying degree to which the blown film web 1 covers the perforations in the reversing rod 14 during the swivelling motion of the reversing rod 14 is evident from Figures 2 and 3, of which Figure 2 shows the smallest degree of coverage and Figure 3 shows the largest degree of coverage. In proportion to the pivot angle of the reversing rod 14 or the internal pressure of the blowing air that fluctuates relative to the varying degree of coverage, the blowing air supply is controlled or regulated in such a manner that the perforations covered by the blown film web 1 are always loaded with blown air of essentially constant pressure.

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What is claimed is:

1. A collapsing and take off device for a plastic blown film web, which is produced by a stationary blown film die in the blown film extrusion process and whose collapsing boards and pinch rolls can be pivoted so as to reverse around the axis of the delivered film tube, wherein the blown film web is guided between the reversing collapsing boards and the pinch rolls, on the one hand, and a stationary deflecting roller, on the other hand, over an outer deflecting roller and an inner reversing rod, both of which are pivotally mounted in the plane parallel to the pivot plane of the pinch rolls, and wherein the reversing rod, around which the blown film is looped, comprises a perforated pipe which is attached to a blower providing a compressed air flow, controlled by a controller or regulator so that, independently of the coverage of the perforations in the reversing rod by the blown film web, the blowing air issues from the covered perforations at approximately the same pressure.

2. Collapsing and take off device, as claimed in claim 1, wherein the controller controls the blowing air supply in proportion to the respective angular position of swivel of the reversing rod.

3. Collapsing and take off device, as claimed in claim 1, further including a meter, which measures the air pressure in the reversing rod and provides a signal to the controller, so that in response to the meter signal, the controller holds the air pressure in the reversing rod at an essentially constant value irrespective of its pivoting angle.

Fig. 1

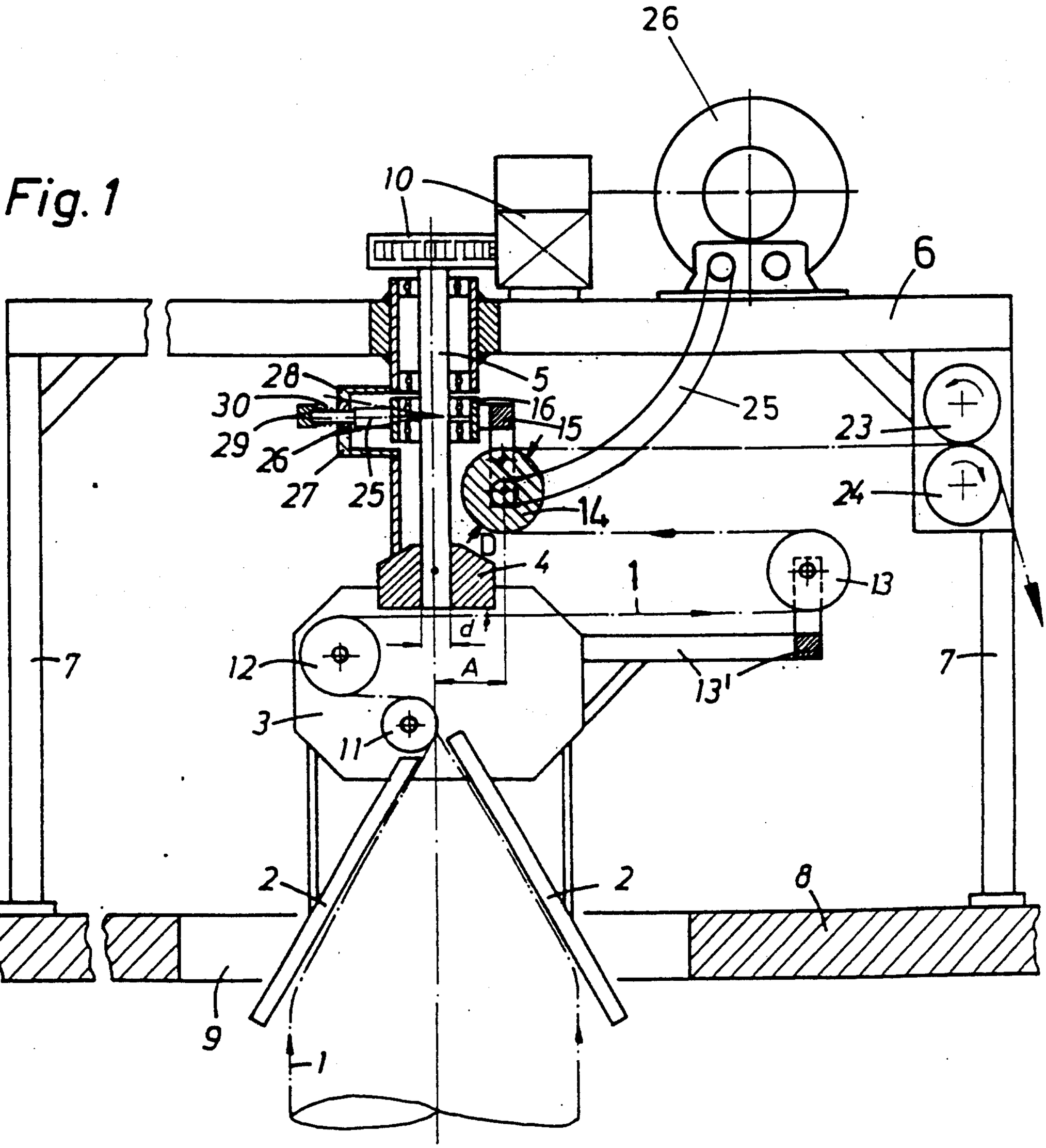
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Fig. 2 [0°]

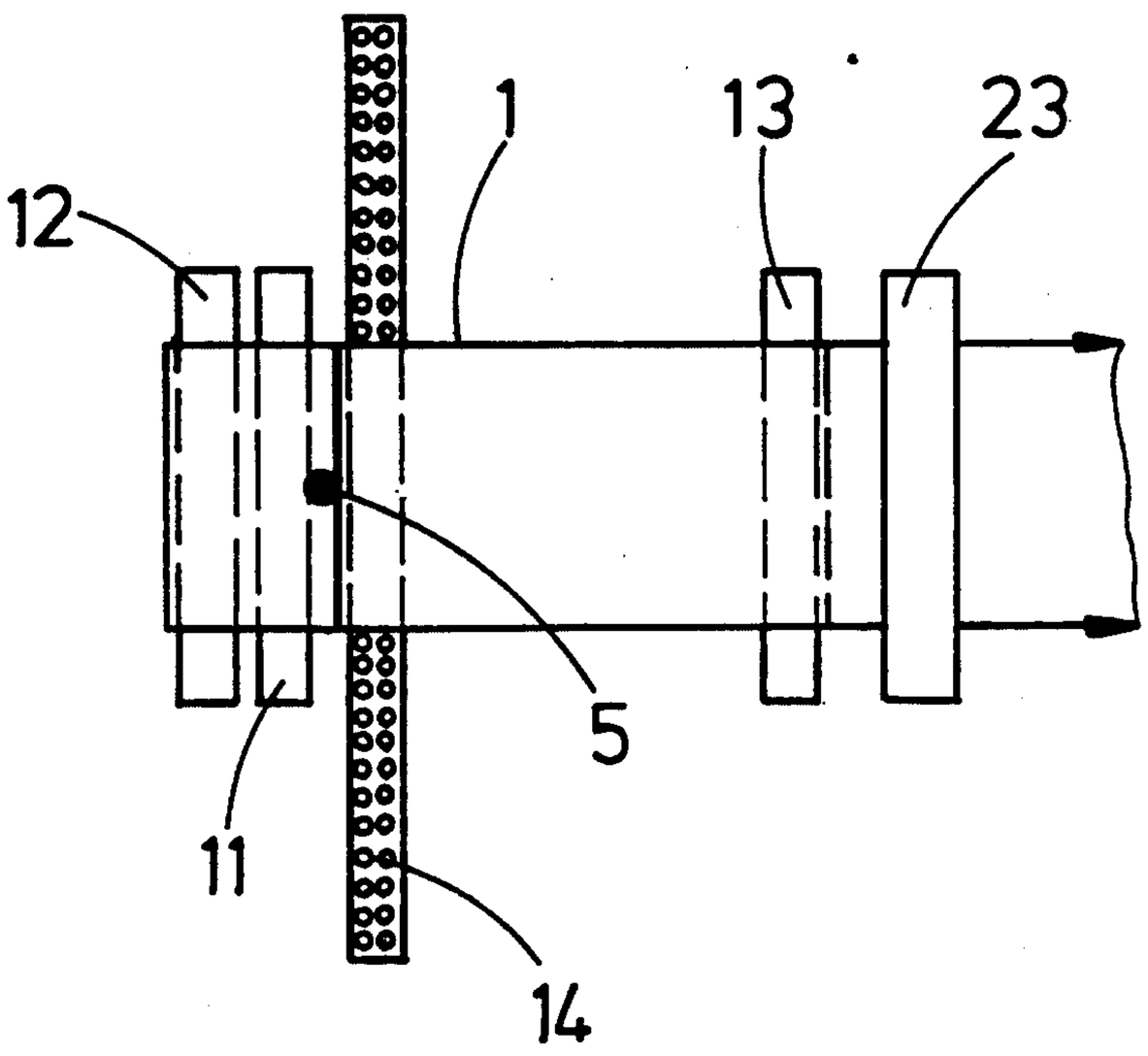

Fig.3 [max]