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DEVICE FOR REGULATING THE DISTRIBUTION AND DIRECTION OF A GASEOUS MEDIUM

Filed March 16, 1959

FIG. 1.

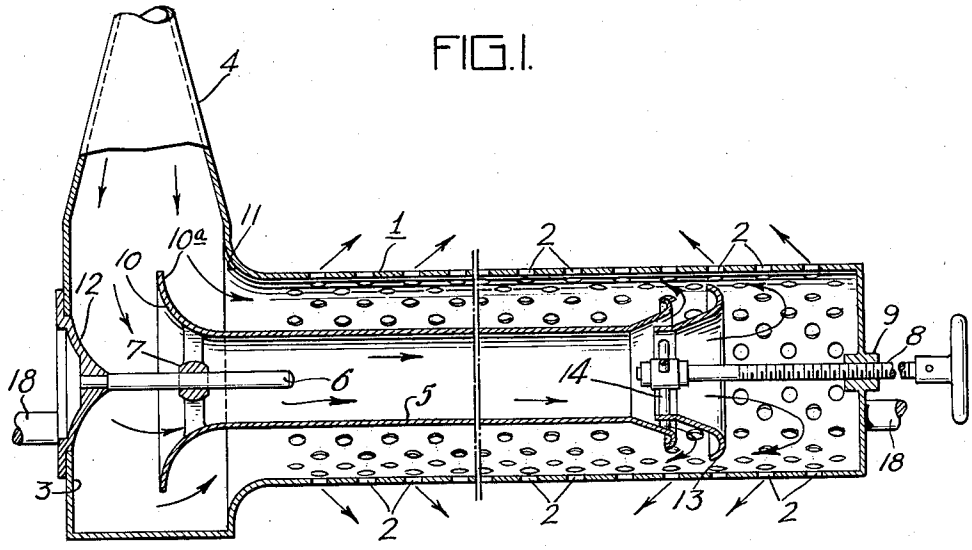
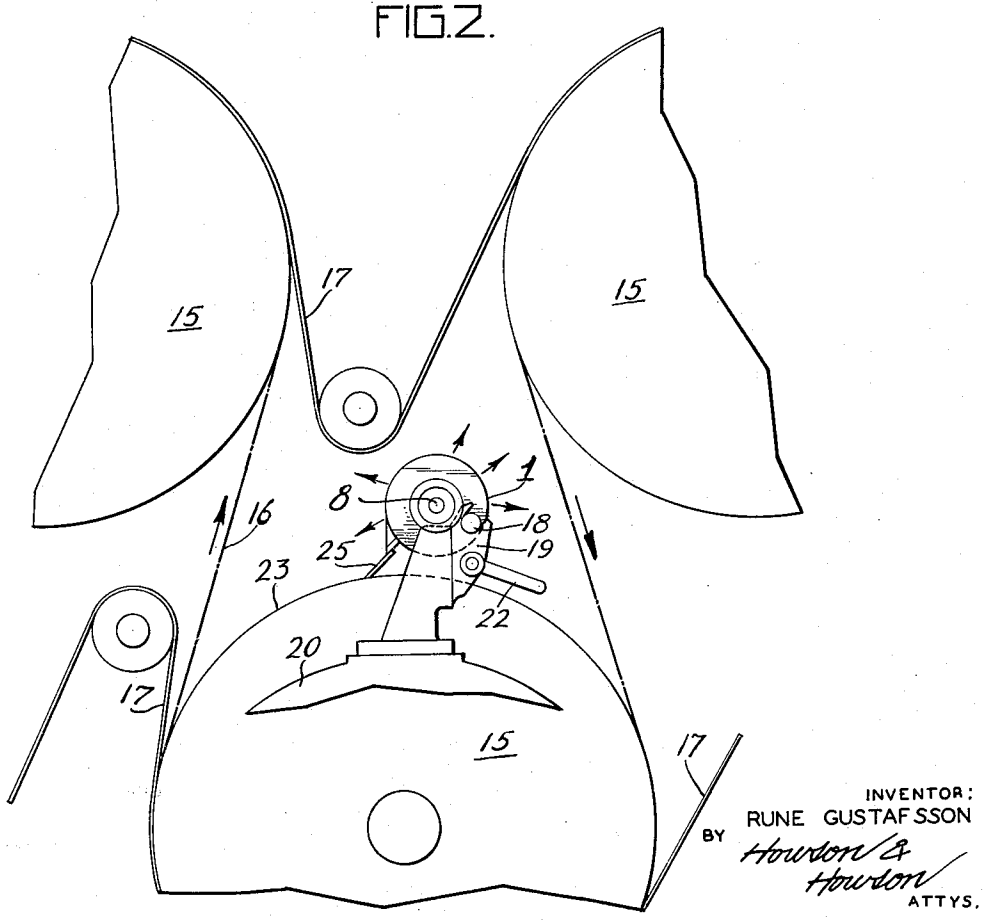


FIG. 2.



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DEVICE FOR REGULATING THE DISTRIBUTION AND DIRECTION OF A GASEOUS MEDIUM

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2 Claims. (Cl. 34—114)

The present invention relates to a device for regulating the distribution and direction of a gaseous medium being blown against a web, and more particularly to a device consisting of a distributing tube arranged across said web and being equipped with outlet openings for the medium, and at one end being connected to a supply chamber for the gaseous medium.

Devices of this kind are provided with outlet openings in form of slots or perforations preferably for supplying the necessary treating medium in driers and other conditioning apparatus for weblike materials, such as paper, cellulose, etc. In cylinder driers such devices are also used to prevent the accumulation of stationary air between the cylinders. Owing to lack of space, the supply of the medium can usually take place only from one side of the drier and the consequent high inlet velocity of the medium results in the distribution of the supplied medium usually being very uneven across the web and giving an unevenly treated product. From the same reason the discharged medium jets are given an undesirable oblique direction, as the discharge direction of the medium jets is dependent upon not only the static pressure acting perpendicularly to the axis of the distributing tube but also upon the dynamic pressure prevailing in the tube, the components of said static and dynamic pressures giving a resultant more or less obliquely directed in the direction of flow.

The present invention, the object of which is to eliminate the above mentioned drawbacks by simple means, is characterized by an unperforated displaceable inner tube substantially coextensive with and concentrically arranged within said distributing tube, and provided with a softly rounded cone shaped inlet. The outer free marginal portion of the inlet forms an outstanding flange projecting perpendicularly with respect to the axis of said tube and having a diameter such that the inlet end of the distributing tube can be entirely closed by means of said cone shaped inlet when the inner tube is situated in one of its end positions.

By means of said inner tube, a part of the medium introduced into the supply chamber will flow into the inner tube and be discharged at the outlet end of the inner tube. This part of the medium then will be forced to flow in the distributing tube proper in a direction contrary to that of the medium flowing directly into the distributing tube, whereby the action of the dynamic pressure of the medium can wholly or partly be nullified depending upon the axial displacement of the inner tube. The invention will thus give the advantage that by the displacement of this tube varying quantities of medium can be supplied from different ends whereby the impact zone of the air quantities with the accompanying pressure increase can be displaced along the axis of the tube. For example, with the inner tube situated in the end position where its cone shaped inlet entirely closes the direct inlet to the distributing tube, the medium jets are given a discharge direction towards the medium supply end which in certain cases may be desired to guide and center the web during its transport through the treating apparatus.

According to a preferred embodiment of the invention the inner tube is provided at its outlet end with an annular guiding deflector for reversing a part of the medium, said deflector being arranged at some distance from the outlet end of said inner tube.

The invention will now be described in greater detail with reference to the accompanying drawings, showing an exemplifying embodiment of the invention and in which

FIG. 1 is a longitudinal section through a distributing tube made in accordance with the invention, and

FIG. 2 illustrates a part of a cylinder drier provided with distributing tubes according to the invention.

In FIG. 1, a distributing tube 1 for a gaseous medium, is formed with a number of outlet openings 2 which in the illustrated embodiment are evenly distributed around the circumference of the distributing tube. The tube at one of its ends is connected to a supply chamber 3 for gaseous medium supplied to the chamber through a connecting duct 4. An unperforated inner tube 5 is concentrically arranged within the distributing tube. Said inner tube at its inlet end is supported by means of a hub 7 displaceable on a guiding rod 6. At the opposite end the inner tube is supported in a bushing or nut 9 by means of a rod or a screw 8, which is used as operating means for the axial displacement of the inner tube. The inner tube at the end facing the supply chamber is provided with a rounded cone shaped inlet 10, the outer free marginal portion 10*a* of which forms an outstanding flange projecting perpendicularly with respect to the axis of the inner tube and has such a diameter that the inlet end 11 of the distributing tube 1 in one of the end positions of the inner tube 5 is entirely closed by means of said cone shaped inlet. A deflector is provided at 12 to direct the medium into the inner tube 5. An annular guiding deflector 13 for reversing a part of the medium is mounted by means of a number of legs 14 at some distance from the outlet end of said inner tube.

In the operation of the device, the axial position of the inner tube determines the proportioning of the flow of medium between the inner and outer tubes at the inlet ends thereof. As the inner tube is displaced toward the left in FIG. 1, a greater proportion of the medium flows into the outer tube 1 so that the impact zone is moved to the right away from the supply chamber. As the inner tube 5 is displaced towards the right in FIG. 1, a greater proportion of the treating or drying medium flows from the supply chamber into the inner tube 5, displacing the impact zone towards the left and toward the supply chamber. Thus, the position of the tube 5 determines the proportioning of the flow between the inner and outer tubes to determine the resultant axial force exerted on the web by the medium.

As is illustrated in FIG. 2 the distributing tube—in cases when the distributing tube is to be used in cylinder driers—may be turnably and eccentrically journalled in order to be used as a support for the necessary doctor blades.

In FIG. 2 a web-like material 16 is pressed against a number of drying cylinders 15 by means of an endless web of felt 17. The distributing tubes 1 in the illustrated embodiment are eccentrically journalled by means of stub shafts 18 in supports 19, fastened to a frame work 20 of the drying apparatus. A doctor blade 25 is fastened to the distributing tube, which blade by turning the distributing tube can be forced against the cylinder surface 23. A lever 22 is provided for locking the distributing tube in a desired position. The perforation of the distributing tube should in every case be suited to the position of the distributing tube with respect to the web.

What I claim is:

1. A device for regulating the distribution and direction of a gaseous medium being blown against a web, said device consisting of a supply chamber for the gaseous medium, a distributing tube arranged across said web and being formed with outlet openings along its length

for said medium, said tube having an inlet opening at one end connected to said supply chamber and a closure at the opposite end, an imperforate inner tube of smaller cross section than said distributing tube and having a softly-rounded conical inlet structure open to said supply chamber adjacent the inlet of said distributing tube and an outlet within said distributing tube adjacent the opposite end thereof, the outer marginal portion of said inlet forming radially-disposed flange means having an outside dimension at least as great as the cross section of said inlet opening, and means mounting said inner tube coaxially within said distributing tube for selective axial displacement of said flange into and out of registry with said inlet opening of the distributing tube, said conical inlet structure when in registry with said inlet opening, entirely closing said inlet whereby said gaseous medium is supplied to said distributing tube entirely through the opposite outlet end of said inner tube.

2. A device according to claim 1 including an annular deflector mounted within said distributing tube in axially-spaced relation to said outlet end of said inner tube and operable to reverse a part of the gaseous medium supplied to said distributing tube through said outlet end.

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