Aug. 6, 1968 J. D. WHITTAKER ET AL 3,395,458

COVERS OR HOODS FOR THE ROLLERS OF MACHINES FOR THE TREATMENT OF MATERIAL IN WEB FORM WITH HUMIDIFIED AIR OR STEAM

Filed Oct. 7, 1965 2 Sheets-Sheet 1

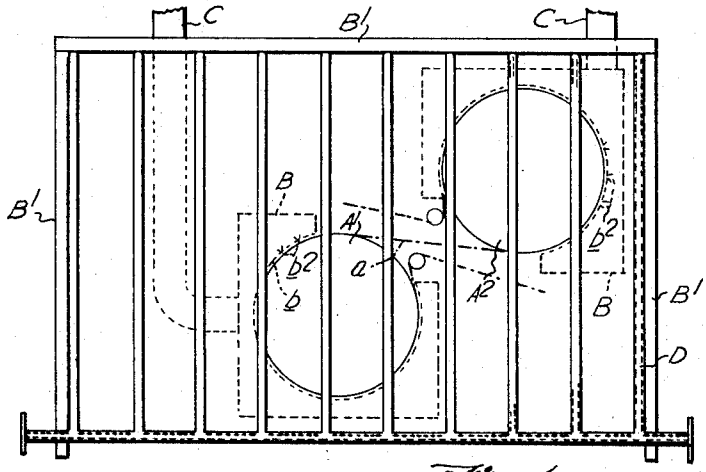

Fig. 1.

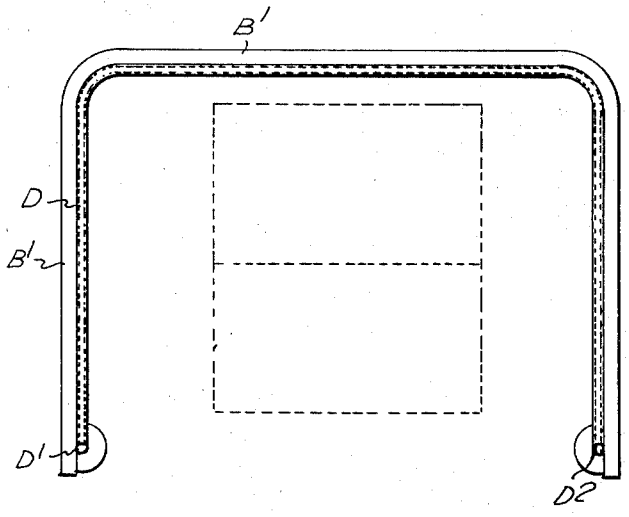

Fig. 2.

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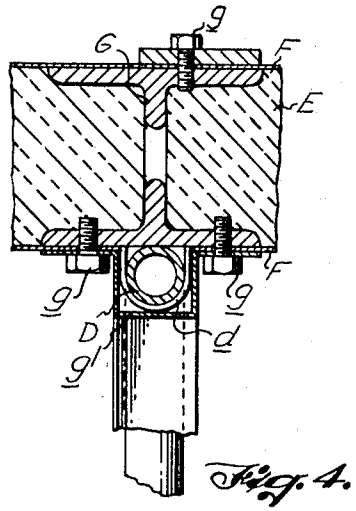

Fig. 4.

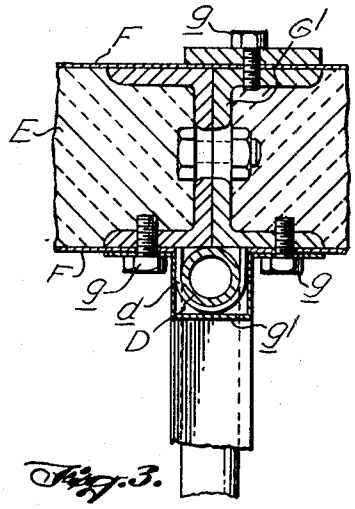

Fig. 3.

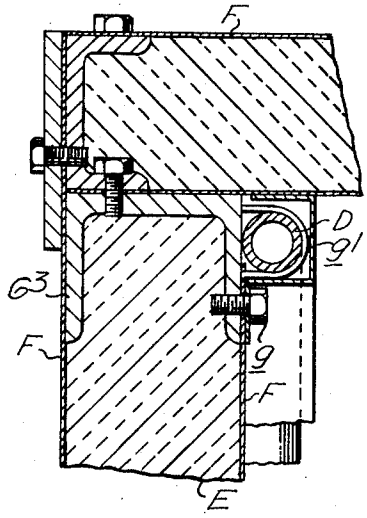

Fig. 5.

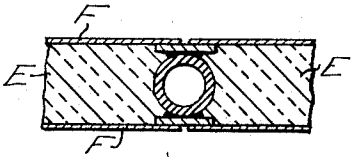

Fig. 6.

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COVERS OR HOODS FOR THE ROLLERS OF MACHINES FOR THE TREATMENT OF MATERIAL IN WEB FORM WITH HUMIDIFIED AIR OR STEAM

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2 Claims. (Cl. 34—114)

ABSTRACT OF THE DISCLOSURE

Apparatus for treating a web with hot fluid comprises one or more drums having the web passed over the major portion of the periphery of each, with apertured fluid pressure box surfaces extending around each drum over the web there, and the entire apparatus is enclosed in a cover to prevent dissipation of the fluid escaping the boxes, the inner surface of the cover being heated, as by hot fluid conducting tubes or electrical elements, to prevent the formation of condensate that might drip onto the portions of the web outside the boxes.

This invention relates to improvements in covers or hoods for the rollers of machines for the continuous treatment of material in web form with humidified air or steam, as for example, a machine for conditioning paper webs.

In such machines the web is passed around a portion of the periphery of a drum or roller or the peripheries of two or more drums or rollers and the humidified air or steam is supplied to the surface of the web from a pressure box or boxes covering the part of the periphery of the drum or roller around which the web passes, the wall of the pressure box adjacent to the drum or roller being of substantially the same curvature as the periphery of the drum or roller and spaced a sufficient distance therefrom to allow the passage of the web, and the said wall having apertures or nozzles through which the humidified air or steam is projected onto the surface of the web. In machines having two or more drums or rollers each drum or roller is provided with a separate pressure box.

Enclosing the drums or cylinders and the pressure boxes is an outer hood or cover which has the function of preventing the overspill of high humidity air into the room. The hood or cover is spaced so as to allow the operator access into the hood and around the drums.

It is found in such machines that there may be a tendency for moisture to condense on the inner surfaces of the walls of the hood or cover, due to the cooler room temperature being transmitted through the metal frame work thereof and condensing into small drops or globules of water which may drop or be projected onto the surface of the web. The object of the present invention is the provision of means which will prevent or minimise the condensation of moisture onto the inner walls of the cover or hood.

This object is achieved according to the present invention by providing means for independently heating the inner surfaces of the walls of the outer hood or cover to a sufficient temperature to prevent condensation of moisture thereon.

The preferred means for heating the inner surfaces of the hood or cover is a series of pipes or tubes arranged in close proximity to the inner surfaces of the walls or

embedded therein through which low pressure steam is circulated. Hot air may also be used as a heating medium, or low temperature electrical heating elements may be used.

So that the invention may be fully understood, it will now be described with reference to the accompanying drawings which show the aforesaid preferred means for heating the inner surfaces of the walls of the cover thereto or the hood. In these drawings:

FIG. 1 is a diagrammatic transverse section of a paper web conditioning machine having two drums around which the web travels, each drum being provided with a pressure box from which humidified air is supplied to the surface of the web.

FIG. 2 is a section on line 2—2 of FIG. 1.

FIGS. 3, 4 and 5 are detail sectional views drawn to a larger scale, showing means for securing heater tubes to the inner surface of the walls of the hood and also illustrating a constructional form of the walls of the hood.

FIG. 6 is a detail sectional view drawn to approximately the same scale as FIGS. 3, 4 and 5 showing a heater tube imbedded in a wall of the hood.

In FIG. 1 which as previously stated is a diagrammatic view of a paper web conditioning machine, the web *a* to be treated passes around two drums A^1 and A^2, a portion of the periphery of each drum with which the web is in contact being surrounded by pressure box B having a wall *b* of substantially the same contour as the periphery of the drum and spaced a short distance from the latter. Humidified air or steam is supplied to each hood B by the duct C. The wall *b* is formed with apertures or nozzles b^2 through which the humidified air or steam is projected onto the surface of the web *a*.

The drums A^1 and A^2 and the boxes B are enclosed in an outer hood or cover B^1 for preventing the escape of high humidity air into the room in which the machine is located.

In order to eliminate condensation on the inner faces of the hood or cover B^1 a series of tubes D are arranged along each of the walls of the hood or cover B^1. The series of tubes D is connected to a common inlet manifold D^1 and an outlet manifold D^2. The inlet manifold D^1 is connected to a source of low pressure steam and the outlet manifold D^2 is connected to an exhaust whereby the low pressure steam can be circulated through all the tubes D to heat the inner surfaces of the walls of the hood or cover B^1.

The walls of the hood B^1 are preferably heat insulated and FIGS. 3, 4, 5 and 6 show suitable construction of such walls as well as suitable means for securing the tubes D in position adjacent thereto or embedded therein. In these figures the walls of the hood are made up of panels formed of slabs or plates E of insulating material between sheets F of metal or other suitable rigid material.

The joints between the insulating panels are made by means of rigid structural members G as shown in FIGURES 3–5. These members may be channel shaped members G^1 as shown in FIG. 3, I-beams as shown in FIGURE 4, or other channels as shown in FIGURE 5. In all instances some of the bolts *g* securing the panels to the structural members also secure a cover or housing g^1 enclosing the steam tube D. FIG. 5 shows an arrangement for securing a steam tube D at a corner between the two walls where the walls are constructed of panels similar to those shown in FIGS. 3 and 4. In this arrangement the cover or housing g^1 for the tube D is secured by the bolt *g* to a channel shaped member G^3 at the end of one of the walls.

Instead of the steam tubes D being secured to the inner surface of the panels forming the walls of the hood, they may be embedded in the insulating material E between

the outer rigid sheets F thereof and such an arrangement is shown in FIG. 6.

What we claim is:

1. In combination, apparatus for the continuous treatment of a web characterized by at least one drum, means for passing said web around the major portion of the drum periphery, means defining an enclosed pressure box having a wall of substantially the same curvature as said drum extending around the drum closely adjacent to said web for a distance substantially equal to the length of web passing around said drum, said pressure box surface being spaced sufficiently from the drum to allow free travel of the web therebetween, means supplying treatment fluid under pressure into said pressure box and means comprising apertures in said surface for directing said fluid onto the web; cover means for enclosing the entire apparatus to prevent the fluid under pressure leaving said pressure box and drum from escaping into the space surrounding said apparatus, said cover means comprising a plurality of laminated sheet metal and heat insulation slabs mounted on a rigid metal framework, and means for heating the inner surface of said cover means to prevent condensation of moisture thereon and thereby protect web portions passing through the apparatus outside said pressure box from such condensate, said heating means being heated fluid conducting tubes embedded in said slabs.

2. In combination, apparatus for the continuous treatment of a web characterized by at least one drum, means for passing said web around the major portion of the drum periphery, means defining an enclosed pressure box having a wall of substantially the same curvature as said drum extending around the drum closely adjacent to said web for a distance substantially equal to the length of

web passing around said drum, said pressure box surface being spaced sufficiently from the drum to allow free travel of the web therebetween, means supplying treatment fluid under pressure into said pressure box and means comprising apertures in said surface for directing said fluid onto the web; cover means for enclosing the entire apparatus to prevent the fluid under pressure leaving said pressure box and drum from escaping into the space surrounding said apparatus and means for heating the inner surface of said cover means to prevent condensation of moisture thereon and thereby protect web portions passing through the apparatus outside said pressure box from such condensate, said pressure box being connected to a relatively high pressure source of treatment fluid such as steam, and said heating means comprising tubes mounted adjacent the inner surface of said cover means connected to a relatively low pressure source of heated fluid such as hot water or steam.

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