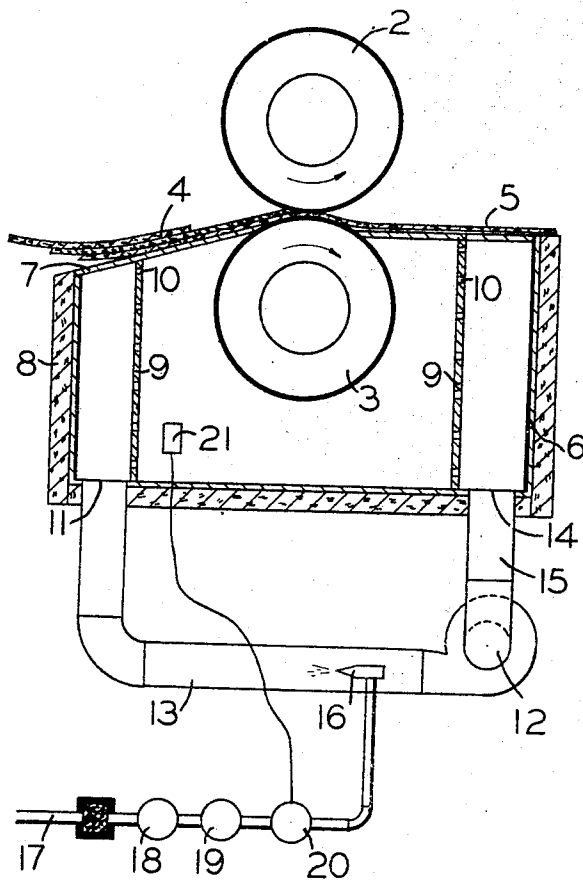


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F. H. CORNELIUS
MOISTURE CONTROL DEVICE

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INVENTOR.

Frank H. Cornelius
by
Walter + Kaufmann

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MOISTURE CONTROL DEVICE

Frank H. Cornelius, Lancaster, Pa., assignor to
Armstrong Cork Company, Lancaster, Pa., a
corporation of Pennsylvania

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1

This invention relates to control devices and, more particularly, to a device for controlling the amount of condensate on the exterior surface of a calender roll.

In the manufacture of variegated hard surface linoleum floor covering, common practice is to calender particles of linoleum mix into a sheet in which the variegations extend longitudinally thereof. Such sheet is then severed into sections, the sections turned though an angle of about 90°, and fed through a cross-rolling calender at right angles to the direction of graining. This serves to further spread the variegations and to obtain what is known as a "marble" graining. The cross-rolling calender includes a hot roll and a refrigerated or cooled roll for the purpose of obtaining the desired marble graining.

It is believed that the type of graining obtained in this process is due to friction between the linoleum sheet being cross-rolled and the refrigerated roll. Since the roll is refrigerated or cooled, vapor from the air condenses thereon and it is believed that such vapor plays a material part in the formation of the graining. Heretofore, no satisfactory means were provided to control the amount of condensate on the refrigerated roll, and hence, it was extremely difficult to control the quality of the graining being formed by the calender, making it difficult to consistently reproduce a desired type of graining.

The chief object of my invention is to provide a device for controlling the amount of condensate on the exterior surface of a calender roll. An object of my invention is to provide control means for controlling the amount of condensate on the exterior surface of a refrigerated calender roll in order to control the type of graining being produced by the calender. A further object is to provide in combination with a calender, means for controlling the amount of condensate on the refrigerated roll thereof. A still further object is to provide a device easily installed on standard calendaring equipment for controlling the type of graining produced by the calender.

This invention relates to a device for controlling the amount of condensate on the exterior surface of a calender roll and comprises, in combination, a housing enclosing the calender roll, means for injecting vapor in the housing, and control means responsive to the amount of vapor in the housing for controlling the injecting means.

This invention further relates to the combination of a cooled calender roll and means for controlling the amount of condensate thereon, said

2

means comprising a housing enclosing the calender roll, means for injecting vapor in the housing, means for circulating vapor through the housing, and control means responsive to the amount of vapor in the housing for controlling the injecting means.

The attached drawing discloses a preferred embodiment of my invention and illustrates diagrammatically the device of my invention installed adjacent the refrigerated roll of a cross-rolling calender.

Referring to the drawing, there is illustrated a calender having rolls 2 and 3. Roll 2 is usually a heated roll while roll 3 is a cold roll and may be cooled by the circulation of water through the interior thereof or refrigerated by the circulation of brine through the interior thereof. Overlapped blankets 4 of linoleum composition are shown in position to be fed through the rolls 2 and 3 to form a grained linoleum sheet 5.

The device of my invention is shown disposed about roll 3 and controls the amount of condensate on the exterior surface thereof. Such device comprises a housing or casing 6, the upper surface thereof forming a table 7 to receive blankets 4. The exterior wall of housing 6 is preferably covered by insulation 8 of any suitable kind. The housing 6 encloses or surrounds roll 3. Within housing 6 are disposed air distribution plates 9 placed on opposite sides of roll 3. Plates 9 contain orifices 10 and serve to distribute the air stream about the exterior surface of roll 3.

An opening 11 is provided in one end of housing 6 and connects the interior of housing 6 with a fan 12 by means of duct 13. The opposite end of the housing is provided with an opening 14 which connects fan 12 with the housing by means of a second duct 15. It will be observed that operation of the fan 12 circulates a stream of air through duct 13 into the interior of the housing 6 and withdraws the stream from the interior of housing 6 through opening 14 and duct 15.

A steam jet 16 is provided which, preferably, is disposed within the interior of duct 13 and serves to inject water vapor or steam into the air stream passing through duct 13. The jet 16 is connected to a steam line 17 provided with a suitable reducing valve 18, a gate valve 19, and a control valve 20. The control valve 20, of course, serves to control the amount of steam being injected through jet 16 into the circulating air stream passing through duct 13.

Suitable control means 21 are provided for

controlling valve 20. Such control means are preferably disposed within the interior of the housing 6 adjacent roll 3 and are responsive to the amount of steam or vapor in the housing for controlling the amount of steam flowing through the valve 20. Such means 21 may comprise any suitable psychrometer, such as a wet and dry bulb differential control or its equivalent, and are connected to valve 20 and serve to control its operation. A Foxboro humidity controller manufactured by the Foxboro Company has been found satisfactory for this purpose.

In the operation of my device, fan 12 forces a stream of air through duct 13 and opening 11 into the interior of housing 6. Such stream of air is broken up by means of plate 9 and distributed about the surface of the roll. Since the roll is cooled or chilled, the vapor carried by the air stream precipitates and condenses on the exterior surface of roll 3. The air stream is then withdrawn from the interior of housing 6 through opening 14 and duct 15 by the fan 12. Control means 21 directly controls the amount of vapor present in the air stream for precipitation or condensation on roll 3. Depending upon the amount of vapor present in the housing 6, control means 21 actuates valve 20 to permit steam to be injected through jet 16 into the air stream in duct 13 which is being circulated to the interior of housing 6. Thus, control means 21 controls the amount of vapor present in the air stream and available to condense on the exterior surface of roll 3 which results in direct control of the film thickness of the condensate on the surface of the roll. Since such moisture film thickness appears to have a direct bearing on the quality or character of the graining being produced by the calender, it will be appreciated that this accurate control of the film thickness of the condensate permits an improved graining to be obtained.

The advantages of my invention are readily apparent. My invention permits more satisfactory control of the graining of variegated surface linoleum. It provides a ready and accurate control of the thickness of the water film disposed on the exterior surface of the cooled roll, thus controlling the type of graining being produced. Such control device is simple and does not require constant attention from the operators of the calender and provides a more accurate means of controlling the film thickness of the condensate than can possibly be provided by the calender operator. The provision of my device eliminates variations in graining due to changing atmospheric conditions and assures a constant accurate control of graining.

While I have described and illustrated a preferred embodiment of my invention, it will be understood my invention is not limited thereto since it may be otherwise embodied and practiced within the scope of the following claims.

I claim:

1. In a device for controlling the amount of condensate on the exterior surface of a calender roll, the combination of a housing enclosing the calender roll, means for injecting vapor into said housing, and controlling means responsive to the amount of vapor in said housing for controlling the injecting means.

2. In a device for controlling the amount of condensate on the exterior surface of a calender roll, the combination of a housing enclosing the calender roll, means for injecting vapor into said housing, means for circulating vapor through said housing, and control means responsive to

the amount of vapor in said housing for controlling the injecting means.

3. In a device for controlling the amount of condensate on the exterior surface of a calender roll, the combination of a housing enclosing the calender roll, a duct connecting the housing with air circulating means, a second duct connecting said housing with said air circulating means, means for circulating a stream of air through said housing and said ducts to supply air to and withdraw air from said housing, means for injecting steam into the circulating air stream, and control means responsive to the amount of vapor in said housing for controlling the injecting means.

4. In a device for controlling the amount of condensate on the exterior surface of a calender roll, the combination of a housing enclosing the calender roll, air distribution plates having orifices therein placed in said housing on opposite sides of the calender roll, a duct connecting the housing with air circulating means, a second duct connecting said housing with said air circulating means, means for circulating a stream of air through said housing and said ducts to supply air to and withdraw air from said housing, means for injecting steam into the circulating air stream, and control means responsive to the amount of vapor in said housing for controlling the injecting means.

5. In a device for controlling the amount of condensate on the exterior surface of a calendar roll, the combination of a housing enclosing the calendar roll, a duct, a fan connected to said housing by said duct adapted to circulate a stream of air through said housing, a second duct connected to said fan to permit the fan to withdraw air from the housing, means for injecting steam into the circulating air stream, and control means responsive to the amount of vapor in said housing for controlling the injecting means.

6. In a device for controlling the amount of condensate on the exterior surface of a calendar roll, the combination of a housing enclosing the calendar roll, air distribution plates having orifices therein placed in said housing on opposite sides of the calendar roll, a duct, a fan connected to said housing by said duct adapted to circulate a stream of air through said housing, a second duct connected to said fan to permit the fan to withdraw air from the housing, means for injecting steam into the circulating air stream, and control means responsive to the amount of vapor in said housing for controlling the injecting means.

7. A device according to claim 4 in which the injecting means comprises a steam jet disposed in said first duct.

8. In a device for controlling the amount of condensate on the exterior surface of a calendar roll, the combination of a housing enclosing the calendar roll, air distribution plates having orifices therein placed in said housing on opposite sides of the calendar roll, a fan adapted to circulate a stream of air in said housing, a duct connecting said fan to said housing, a second duct connecting the opposite end of said housing to said fan, a steam jet disposed in said first duct adapted to inject steam into said circulating air stream, a steam line connected to said jet, a control valve disposed in said steam line, and means disposed in said housing responsive to the amount of vapor in said housing for controlling said valve

5

thereby determining the amount of steam injected in the circulating air stream.

9. A device according to claim 6 in which the upper surface of said housing forms a table for the reception of material to be sheeted by the calendar and in which a layer of insulation material is provided about the exterior surface of the housing.

10. In combination with a cooled calendar roll, means for controlling the amount of condensate thereon, said means comprising a housing enclosing the calendar roll, means for injecting vapor into said housing, and control means responsive to the amount of vapor in said housing for controlling the injecting means.

11. In combination with a cooled calendar roll, means for controlling the amount of condensate thereon, said means comprising a housing enclosing the calendar roll, means for injecting vapor into said housing, means for circulating vapor through said housing, and control means responsive to the amount of vapor in said housing for controlling the injecting means.

12. In combination with a cooled calendar roll, means for controlling the amount of condensate thereon, said means comprising a housing enclosing the calendar roll, a duct connecting said housing with air circulation means, a second duct connecting said housing with said air circulating means, means for circulating a stream of air in said housing and said ducts to supply air to and withdraw air from said housing, means for injecting steam into the circulating air stream, and control means responsive to the amount of vapor in said housing for controlling the injecting means.

13. In combination with a cooled calendar roll, means for controlling the amount of condensate thereon, said means comprising a housing enclosing the calendar roll, air distribution plates having orifices therein placed in said housing on opposite sides of the calendar roll, a duct

6

connecting said housing with air circulation means, a second duct connecting said housing with said air circulating means, means for circulating a stream of air in said housing and said ducts to supply air to and withdraw air from said housing, means for injecting steam into the circulating air stream, and control means responsive to the amount of vapor in said housing for controlling the injecting means.

14. In combination with a cooled calendar roll, means for controlling the amount of condensate thereon, said means comprising a housing enclosing the calendar roll, air distribution plates having orifices therein placed in said housing on opposite sides of the calendar roll, a duct connecting said housing with a fan, a fan for circulating a stream of air into said housing, a second duct connecting said fan with said housing to permit it to withdraw a stream of air from said housing, means for injecting steam into the circulating air stream, and control means responsive to the amount of vapor in said housing for controlling the injecting means.

15. In combination with a cooled calendar roll, means for controlling the amount of condensate thereon, said means comprising a housing enclosing the calendar roll, air distribution plates having orifices therein placed in said housing on opposite sides of the calendar roll, a fan adapted to circulate a stream of air in said housing, a duct connecting said fan to said housing, a second duct connecting the opposite end of said housing to said fan, a steam jet disposed in said first duct adapted to inject steam into the circulating air stream, a steam line connected to said jet, a control valve disposed in said steam line, and means disposed in said housing responsive to the amount of vapor in said housing for controlling said valve thereby determining the amount of steam injected into the circulating air stream.

FRANK H. CORNELIUS.

Certificate of Correction

Patent No. 2,437,680.

March 16, 1948.

FRANK H. CORNELIUS

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows: Column 1, line 10, for the word "though" read *through*; column 2, line 27, for "covered by" read *covered with*; column 4, lines 32 and 34, claim 5; lines 44, 46, and 48, claim 6; lines 62, 64, and 66, claim 8; column 5, line 6, claim 9; lines 9 and 12, claim 10; line 16, claim 11; in each instance the word "calendar" should read *calender*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of May, A. D. 1948.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.