Oct. 13, 1959 J. L. BRYANT 2,908,212

VAPOR CONFINING AIR CURTAIN FOR PAPER MACHINES

Filed Sept. 30, 1957 3 Sheets-Sheet 1

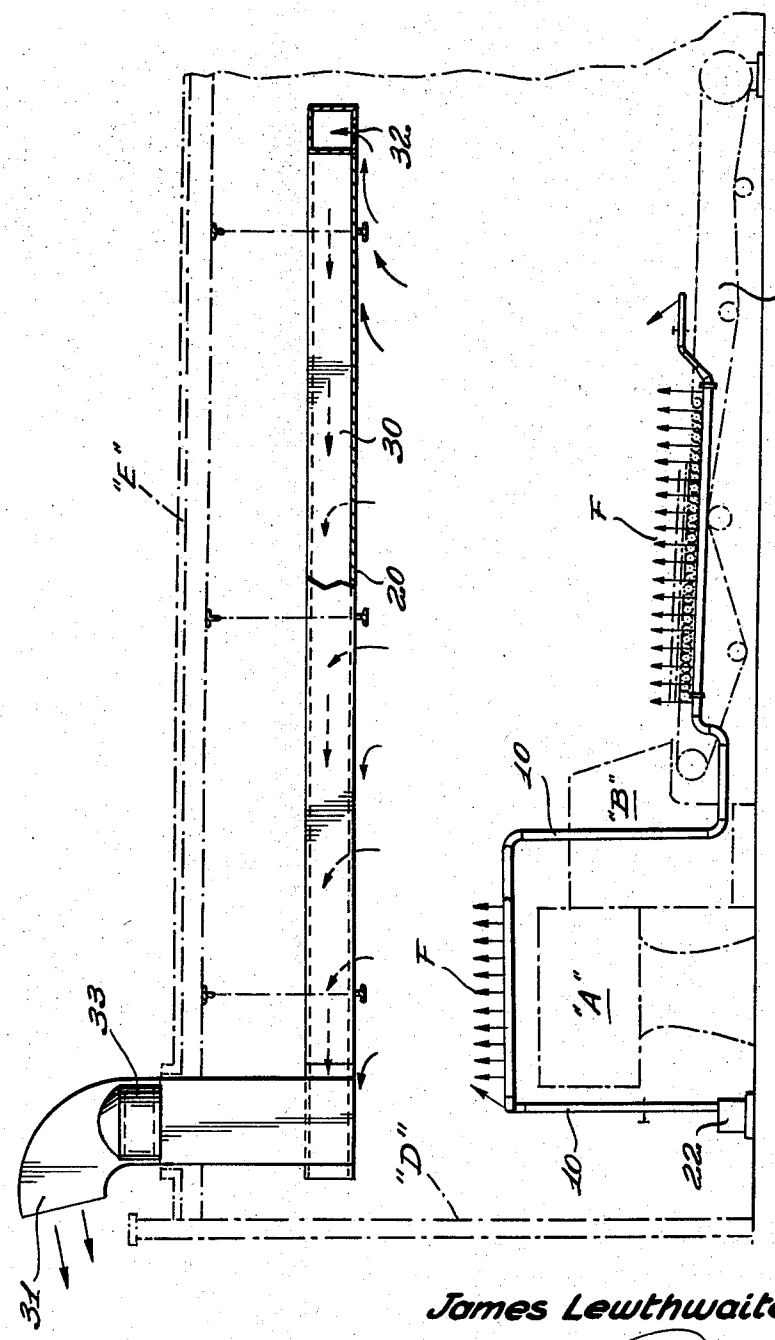


Fig-1

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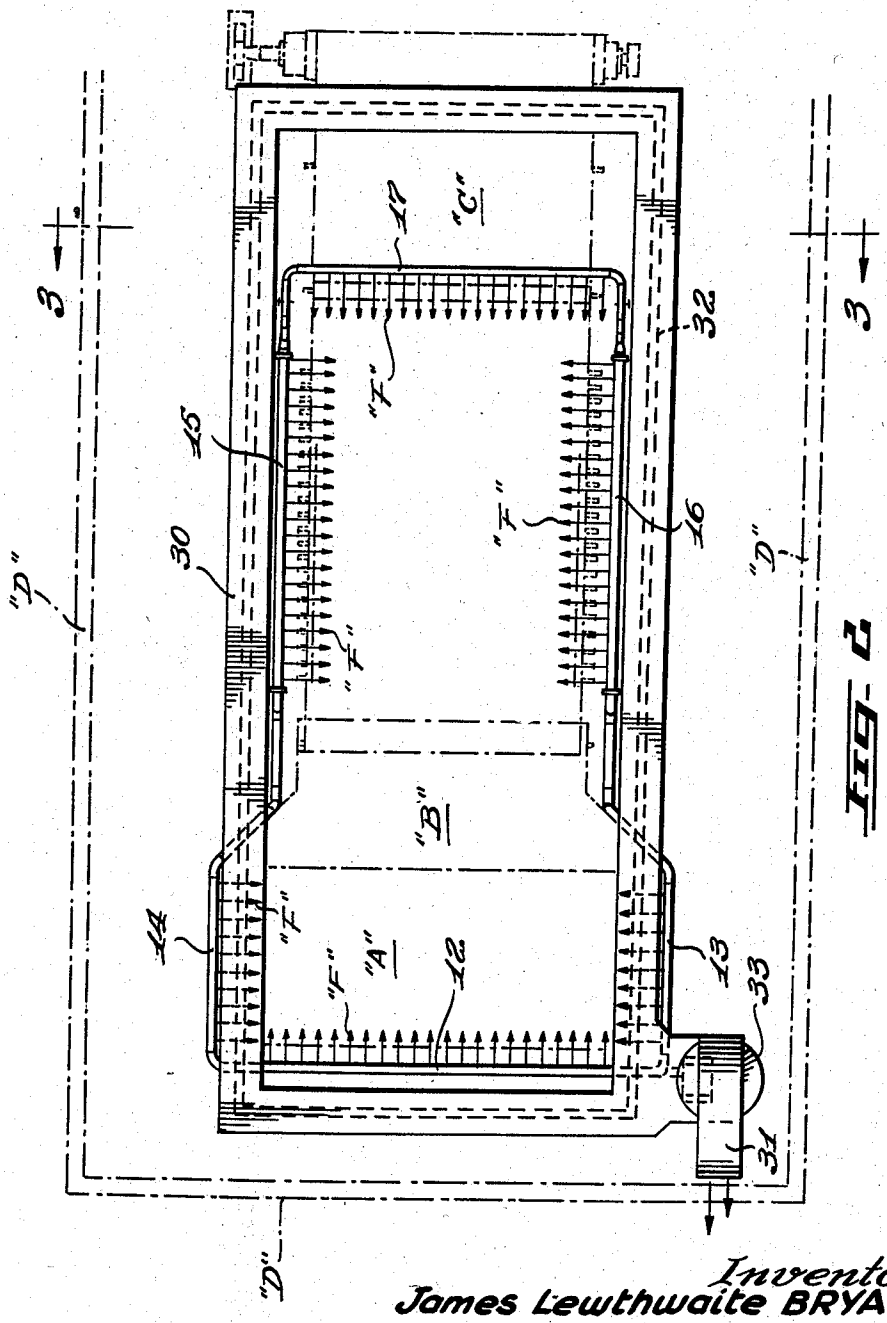


Fig. 2

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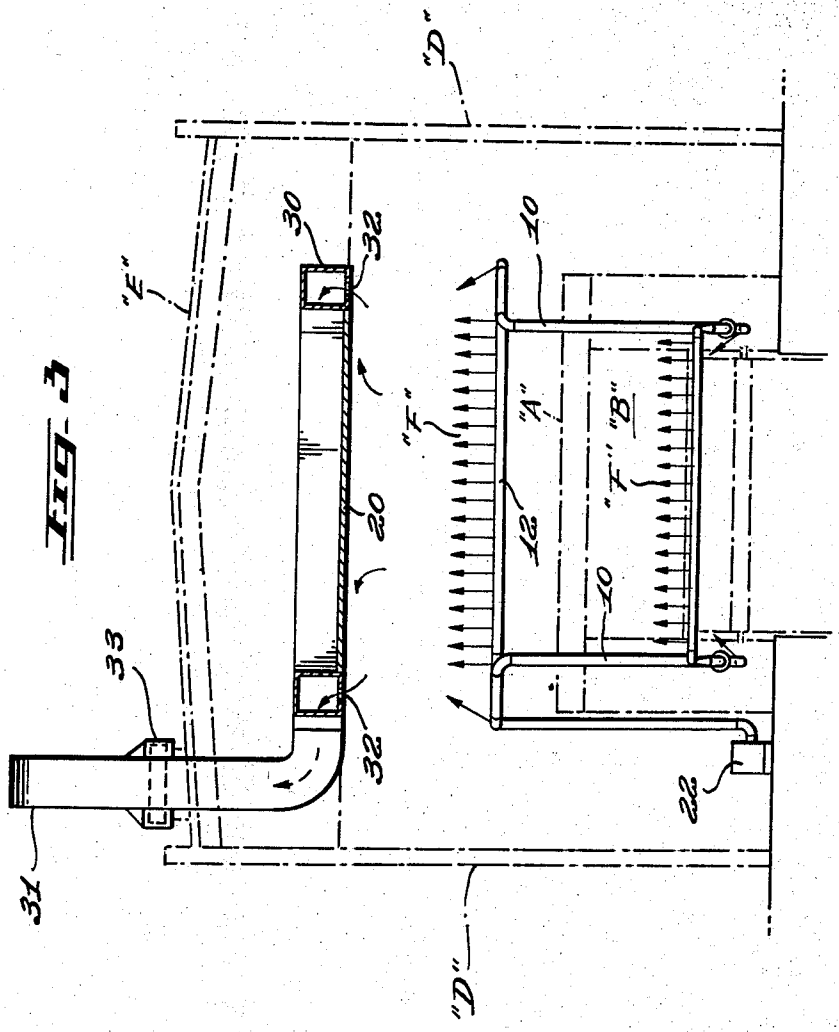


Fig. 3

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VAPOR CONFINING AIR CURTAIN FOR PAPER MACHINES

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2 Claims. (Cl. 98—36)

The present invention relates to a method of controlling the temperature and humidity within the machine rooms of paper mills.

At the present time the machine room or portion of a paper mill housing the "wet end" of paper-making equipment including screens, head box, slice, and Fourdrinier, is a difficult place to work in due to the generally high temperature and humidity of the air within the room. Although the air in machine rooms of paper mills has always been somewhat hot and humid, this condition has been intensified in recent years. This raising of temperature and humidity is due to the fact that under modern day requirements for higher production, higher temperatures have been applied to stock and equipment to accelerate paper manufacturing processes.

Since machine rooms in a paper mill are quite large it is practically impossible to condition the air in the entire room by known air conditioning methods. It is also impossible from a practical viewpoint to confine the equipment by partitioning or shrouding since it is essential that the equipment be readily accessible on all sides.

The present invention aims to provide a solution to this problem by providing means whereby the water vapor and heated air created around the "wet end" of a paper machine is confined to the room area about the machine and withdrawn from this area to the exterior of the room without blocking access to the equipment in any way. This is accomplished in accordance with the invention by providing an air curtain formed by jets of supply air which are directed upwards towards a false ceiling provided over this area of the machine room. The air jets are supplied from a system of nozzle pipes or conduits which are arranged to completely ring the vapor producing sections of the Fourdrinier including the head box if open, and the screens if any.

In accordance with the present invention the supply air volume is small and at relatively high pressure and the nozzle pipes are maintained at the smallest practical diameter so as to interfere or obstruct as little as possible with the operation of the machine. The actual nozzle emitting the air jet can be in the form of aligned rows of relatively small round openings or alternatively can be made as an elongated slot extending the length of a pipe section, whichever proves to be most desirable from a construction viewpoint when the system is applied to a particular machine. Preferably the fan or blower supplying the air to the nozzles is located in the machine room and draws the supply air from the interior of the room.

With the present system the supply volume induces vapor from the Fourdrinier and air from the machine room in a ratio generally of about 100 parts of induced air to 1 part of supply air and this total volume is exhausted through a corresponding system of ductwork ringing the false ceiling over the Fourdrinier section. The lower face of the exhaust ductwork ring or header is preferably provided with a slot which is substantially continuous through which the air-vapor mixture is withdrawn from the room. An exhaust fan, located exteriorly

of the room, for example, on the machine room roof, is connected to the exhaust ductwork to provide the necessary suction effect.

Having thus generally described the nature of the invention, particular reference will be made to the accompanying drawings which illustrate by way of an example an air control system according to the invention as it would appear installed in a paper mill machine room, and in which:

Figure 1 is a somewhat diagrammatic view in side elevation and partially in section of an air supply piping system and exhaust ductwork constituting a confining air curtain in accordance with the invention in operational position about the head box, slice and wet end of a Fourdrinier in a paper mill machine room;

Figure 2 is a plan view of the arrangement shown in Figure 1;

Figure 3 is a sectional view of Figure 2 along the line 3—3.

With reference to the accompanying drawings, an air curtain system in accordance with the invention is shown somewhat diagrammatically as it would be located in the machine room of a paper mill so as to surround and confine the moisture vapor emitting from the "wet end" of a paper machine. In these drawings, screens A, head box B and Fourdrinier C are indicated in broken lines in their relative locations within the machine room also indicated in broken lines as having side walls D and a roof structure E.

In accordance with the invention, a continuous system of air supply pipes **10** is mounted on, or supported adjacent to, the screens A, head box B and the "wet end" of the Fourdrinier C so as to form a continuous ring about these portions of the machine. The pipes **10** are provided, in the sections **12**, **13**, **14**, **15**, **16** and **17**, in the construction shown, with a plurality of openings or nozzles through which air is jetted upwardly and inwardly as indicated by the arrows F towards a false ceiling **20** suspended from the roof structure E. Air is supplied to the piping system **10** by a supply fan or blower **22** located within the machine room as shown. A system of ductwork **30** is provided which is mounted on and extends about the periphery of the false ceiling **20** with the lower surface of the interconnected ducts being provided with a substantially continuous slot or slots **32** whereby the air vapor mixture directed against the false ceiling is entrained within the ducts by the action of an exhaust fan **33** and discharged through an outlet **31**. The exhaust fan **33** and exhaust outlet **31** are preferably located on the machine room roof E as illustrated.

As will be seen, with particular reference to Figure 2 of the drawings, the exhausting ductwork **30** surrounding the "wet end" of the Fourdrinier is located beyond or outside of the corresponding air supply pipes and the outer marginal edges of the Fourdrinier wire so as to avoid the possibility of any moisture condensation on the ducts from dripping back onto the wire.

This arrangement provides a continuous current or curtain of air rising upwardly and inwardly over the portions of the paper forming equipment whereby the moisture vapor is substantially confined within the area surrounded by the air supply system pipes and entrained with the supply air against the false ceiling **20** where the air vapor mixture is collected and exhausted by the ductwork **30**.

As previously mentioned, the supply volume of air forming the curtain as directed upwardly towards the false ceiling **20** will induce vapor emitting from the "wet end" portion of the machine. This air, drawn through the fan **22** from the machine room in a ratio generally of the order of one (1) part of supply air to one hundred (100) parts of induced air and this total

volume of air-vapor mixture, is exhausted through the ductwork **30**. Since the supply air is withdrawn from the interior of the machine room, this creates a circulation of air into the machine room which helps to maintain the desired reduced temperature and moisture content of the air.

It will be appreciated that the illustrated piping system **10** and ductwork **30** are illustrative only and that this could be varied to suit other machine room arrangements without departing from the scope of the invention.

I claim:

1. An apparatus adapted to confine moisture-laden gases emitting from the "wet end" of a paper-making machine, to the immediate area of a machine room containing said paper machine "wet end" by collection of gases within said room and exhaust of said gases in a remote location, comprising in combination, an endless air supply conduit system surrounding at least the portions of said machine emitting said gases, portions of the conduit making up said system having air emitting openings directed inwardly and upwardly relative to the upper surface of said machine, air induction means having an intake disposed within said machine room and being connected to said conduit system so as to be adapted to supply air under pressure through said conduit air emitting openings whereby a moving air curtain is created about the machine portions so surrounded, a false ceiling suspended within said machine room above said paper-making area so surrounded and being adapted to entrap and deflect said curtain of forced air and moisture vapor entrained thereby, a continuous ductwork surrounding the outer periphery of said false ceiling, said ductwork having air-vapor entraining openings along the length of its lower surface and terminating in an exhaust portion extending from said false ceiling, and air exhausting means connected to said ductwork exhaust portion and having an exhaust outlet disposed exteriorly of said machine room.

2. An apparatus adapted to confine moisture-laden gases emitting from the "wet end" of a paper-making machine, to the immediate area of a machine room containing said paper machine "wet end" by collection of gases within said room and exhaust of said gases in a remote location, comprising in combination, an endless air supply conduit system surrounding at least the portions of said machine emitting said gases, portions of the conduit making up said system having air emitting openings directed inwardly and upwardly relative to the upper surface of said machine, air induction means having an intake disposed within said machine room and being connected to said conduit system so as to be adapted to supply air under pressure through said conduit air emitting openings whereby a moving air curtain is created about the machine portions so surrounded, an air deflecting and collecting member suspended in said room above said paper-making area adapted to entrap and deflect said curtain of forced air and any moisture entrained thereby, air-vapor entraining means adjacent said air deflecting member adapted to entrain said air-vapor mixture deflected by said member and air exhausting means to exhaust said entrained mixture exteriorly of said machine room.

References Cited in the file of this patent

UNITED STATES PATENTS

2,000,546	Woodsome	May 7, 1935
2,500,606	Dosmar	Mar. 14, 1950
2,565,933	Schneible	Aug. 28, 1951
2,567,776	Lundy	Sept. 11, 1951
2,593,702	Schneible	Apr. 22, 1952

FOREIGN PATENTS

481,991	Great Britain	Mar. 22, 1938