March 5, 1974 J. H. DUPASQUIER 3,795,578

COMPOSITE STEAM CHAMBER FOR USE ON A TRAVELING PULP MAT

Filed May 30, 1972 2 Sheets-Sheet 1

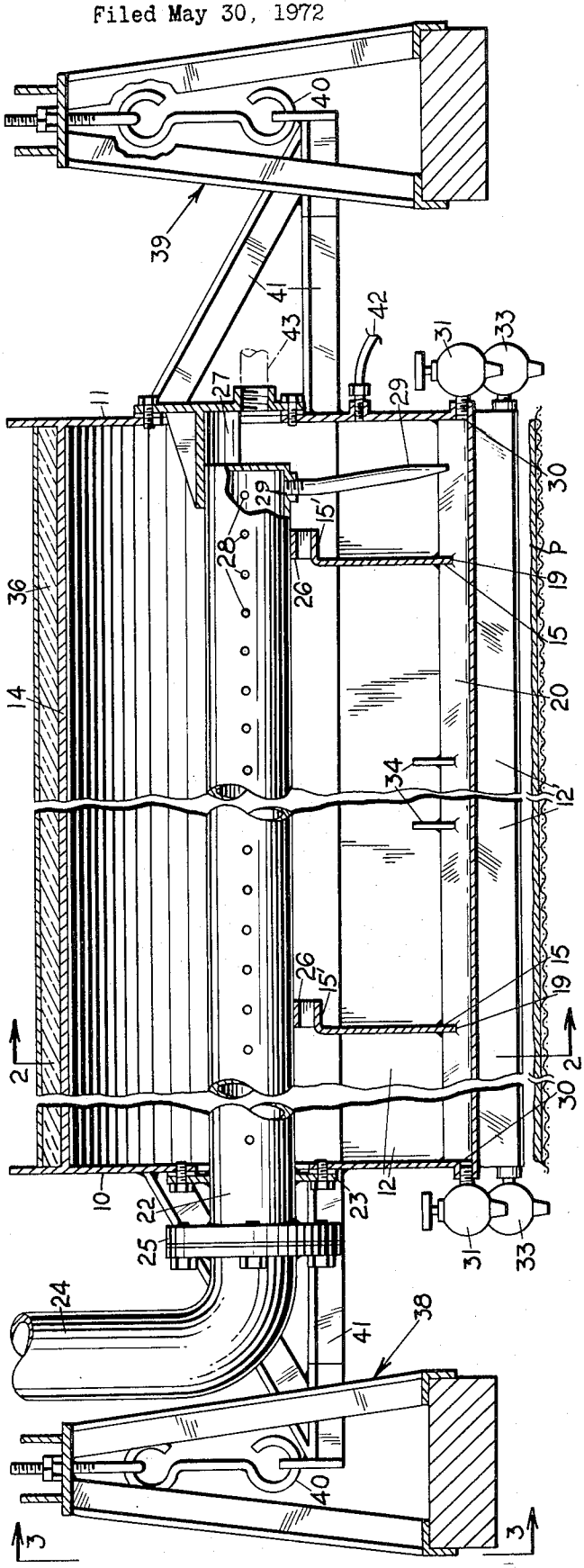


FIG. 1

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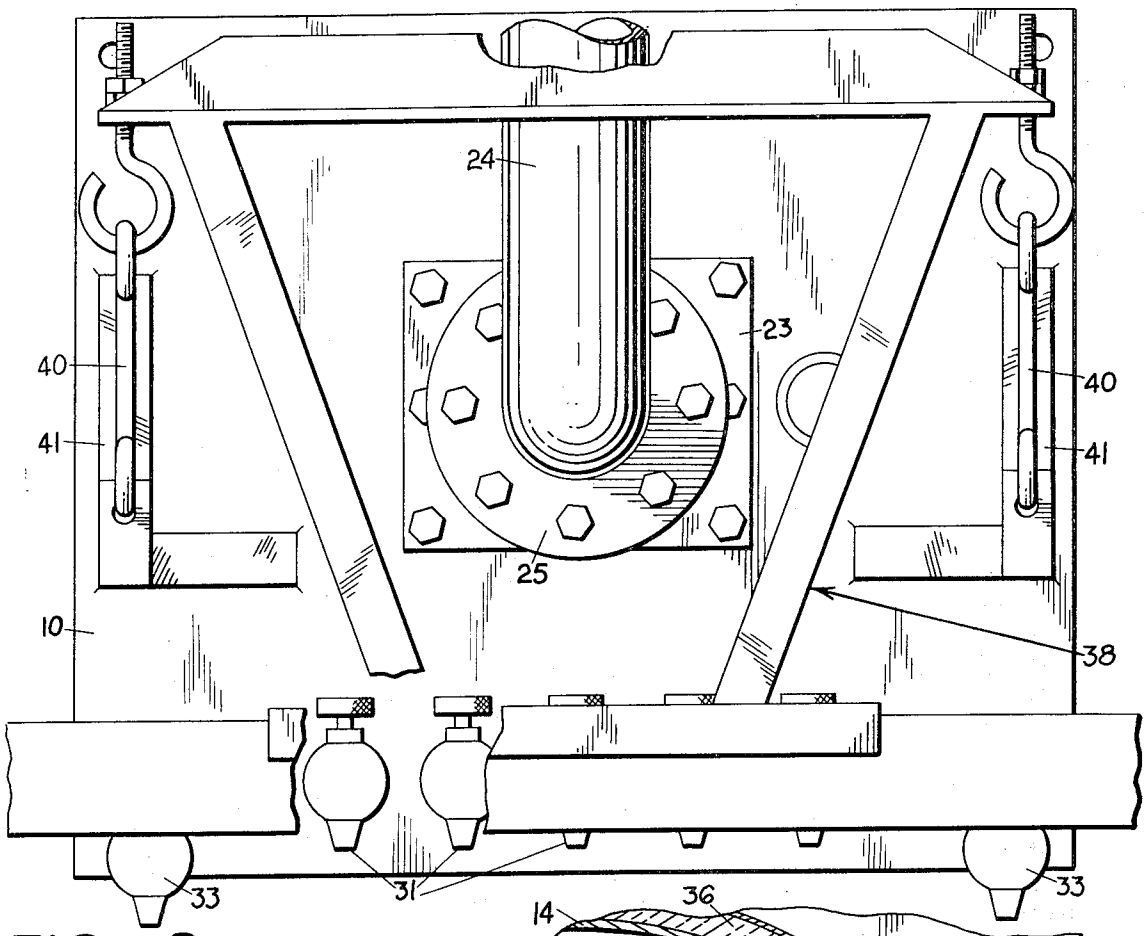
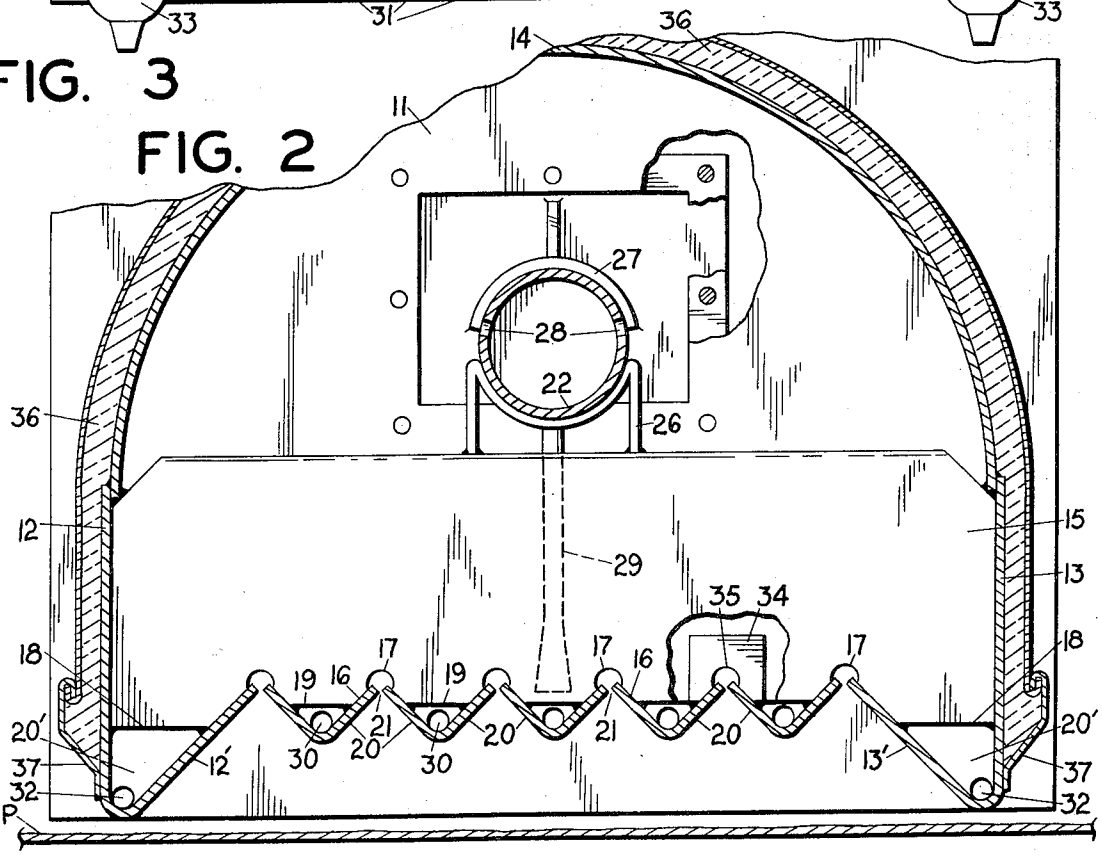


FIG. 3

FIG. 2



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COMPOSITE STEAM CHAMBER FOR USE ON A TRAVELING PULP MAT

Joseph Henry Dupasquier, 5855 NW. Skyline Drive, West Linn, Oreg.

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U.S. Cl. 162—290 5 Claims

ABSTRACT OF THE DISCLOSURE

An elongated chamber, mounted to extend transversely above a pulp mat, includes parallel end walls connected by bottom side walls and a rounded top wall. Cross plates extend between the side walls, and a plurality of troughs, forming the bottom of the chamber, are supported from the cross plates with their top edges spaced a slight distance apart for the discharge of steam therethrough. A steam delivery pipe extends along in the chamber supported above the cross plates. Water collecting in the valleys of the troughs is discharged through drain caps at the end walls.

BACKGROUND OF THE INVENTION

The present invention is concerned with an apparatus for discharging steam down on a traveling pulp mat for the purpose of aiding in the evaporation of the water from the pulp mat, and the steam chamber of this invention in general is similar to that described in U.S. Pat. No. 2,838,982, issued June 17, 1958. However, when the steam chamber, as described in the previously mentioned patent, is desired for use over a wide pulp mat, and thus when the steam chamber is required to be made of considerable length, problems in manufacturing and maintenance costs have been encountered due in considerable part to the size and weight of such a chamber. The object of the present invention is to provide a composite steam chamber designed to serve the same purpose in a similar manner, which will be more practical to manufacture, particularly when required to be of considerable length, proportionately lighter in weight, and, while enabling lighter weight material to be used, nevertheless, due to the novel braced construction, will be less likely to develop flaws of construction.

SUMMARY OF THE INVENTION

The elongated steam chamber has vertical end walls which are connected by bottom side walls. A plurality of vertical cross plates extend between the side walls at regular intervals. The bottom edges of these cross plates are located above the bottoms of the side and end walls and the bottom edges of the cross plates are specially contoured so as to have a series of V-shaped troughs separately supported from them and extending from one end wall to the other. The bottom edges of the side walls turn upwardly and inwardly and engage the cross plates and form a pair of lower troughs along each side of the chamber. The series of troughs which complete the bottom of the chamber between the side troughs have their bottom lines located in a plane spaced above the plane of the bottom edges of the end and side walls. The top edges of adjacent troughs in the bottom of the chamber are all spaced a slight distance apart, forming narrow, restricted slots extending the length of the chamber through which slots the steam is discharged downwardly onto the pulp mat. Drain caps are provided at each end wall to enable any water collected in each trough to be drained off. Steam is delivered into the chamber by a steam pipe which passes through one end wall, extends substantially

the entire length of the chamber, and discharges steam from perforations along the sides of the pipe. The inner end of the pipe has a bottom water drain which leads into the end of one of the bottom troughs. The chamber is mounted in place by adjustable support means connected to each end wall.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a foreshortened side sectional elevation of the entire steam chamber taken substantially along its center line, showing the chamber in position over a pulp mat and the support mounting means beyond each end of the chamber;

FIG. 2 is a transverse section taken on line 2—2 of FIG. 1, drawn to a larger scale; and

FIG. 3 is an end elevation taken on the line indicated at 3—3 in FIG. 1, drawn to the same scale as FIG. 2.

In FIG. 1 the end walls of the chamber are shown at 10 and 11. In FIG. 2 the side walls are shown at 12 and 13, and their inwardly-upwardly-extending portions are marked 12' and 13' respectively. 14 indicates the curved top wall, the ends of which are welded to the end walls 10 and 11 respectively and the bottom edges of which are welded to the top edges of the side walls 12 and 13, as shown in FIG. 2.

A plurality of parallel, identical, and equally-spaced cross plates 15 extend between the side walls 12 and 13. One of these is shown in full in FIG. 2. The bottom edge of each of these cross plates 15 does not extend down as far as the bottom edge of the side walls, and the bottom edge of each cross plate is formed with cut-out notches 16, each notch having upwardly-inwardly sloping side portions terminating in an enlarged cut-out top portion 17. The purpose of the latter will be explained later on. The first notch at each end of the cross plate has its first edge welded to the top portion of the corresponding extension 12' or 13' of the side wall of the chamber. Between the extension 12' or 13' and the side walls the bottom edge of the cross plates, as indicated at 18 in FIG. 2, extends down slightly lower than the remaining intervening bottom edge portions 19 of the cross plate in between the notches 16 to provide greater bracing strength.

A plurality of identical, separate troughs 20 (FIG. 2) have the upper portions of their side walls welded to the respective edges of the notches 16 in each cross plate. These troughs extend the entire length of the chamber and the ends are welded to the respective end walls 10 and 11. The troughs 20 are entirely separate from each other and the adjacent top edges of the trough are slightly spaced apart a fraction of an inch to provide a series of slots 21, continuing the entire length of the chamber, through which steam is discharged from the chamber down onto the pulp mat. The traveling pulp mat, across which the steam chamber extends, is indicated at P in FIGS. 1 and 2.

Steam under pressure is delivered into the chamber through a steam pipe 22 which passes into the chamber through a mounting plate 23 (FIGS. 1 and 3) which extends over an opening in the end wall 10. The pipe 22 is connected through a connection 25 to a pipe 24 leading from a suitable source of steam. The pipe 22 extends substantially the entire length of the chamber and is supported by cradles 26 mounted on the tops of the cross plates 15, one such cradle 26 being shown in FIG. 2. The top edge of each cross plate is formed with a right angle flange 15' which not only gives a better mounting for the cradle 26 but adds strength to the cross plate. The inner end of the steam pipe 22, which is closed off and which terminates close to the end wall 11, as shown in FIG. 1, extends under a hood 27 secured to the end wall 11, which

allows longitudinal movement of the end of the pipe when the pipe is expanded or contracted by heat change, but which holds the pipe end against movement laterally or upwardly. Perforations **28** are provided along each side of the pipe **22** for the discharge of steam into the chamber, and a drain **29** in the bottom of the pipe at its end enables any water collecting in the pipe to pass down a guideway into the valley of one of the bottom troughs.

A drain outlet **30** is provided in each of the end walls **10** and **11** for the bottoms of the troughs **20**, and a tap **31** is mounted on each end wall at each outlet. Similarly, a drain outlet **32** is provided in each of the end walls for the bottoms of the two lower side troughs **20'** formed by the bottom inward upward extensions of the side walls, and a tap **33** is mounted on the end walls at each of these outlets **32**.

As previously mentioned, the troughs forming the bottom of the steam chamber are all separate from each other, but their adjacent top edges are spaced only a slight distance (preferably about ⅛ of an inch) apart, thus forming slots **21** for the discharge of the steam down on the pulp mat, and, as mentioned, the slots extend uninterruptedly for the entire length of the chamber. To prevent any possibility of the slots becoming clogged where they pass through the cross plates **15**, the notches in the bottom edges **19** of the cross plates for the upper portions of the troughs are formed with an enlarged cut-out, preferably rounded, portion **17** to aid in maintaining the slots unobstructed.

Since the troughs **20**, as well as other parts of the composite chamber, are preferably made of comparatively thin sheet metal, considering the large overall size in which the chamber is designed to be made, there might be a tendency for the slots **21** to become slightly distorted in between the points where they are secured by the cross plates **15**. To avoid this possibility, instead of adding more cross plates than would otherwise be required, slot-holding members **34**, one of which is shown in FIG. 2, are mounted over the slots in between the cross plates **15**. These slot-holding members comprise small vertical plates having their bottom edge notched to conform to the notches on the bottom edges of the cross plates **12**, and thus with an enlarged cut-out portion **35** (FIG. 2) at the top of the notch, similar to the portion **17** in the notches in the bottom edge of the cross plates **15**. These members **34** are welded to the top edges of the troughs and are positioned midway in between the cross plates **15** and in parallelism with them.

A covering **36** of heat insulation material is placed over the top and sides of the chamber, as shown in FIG. 2, the bottom edges of this covering being held by a pair of metal flanges **37** extending the length of the chamber and secured on the outside of the bottom portion of the side walls **12** and **13** respectively.

The chamber is supported in desired position above the traveling pulp mat by means of a pair of standards, indicated in general by the references **38** and **39**, which are secured on the support frame of the papermaking machine, each standard carrying a pair of adjustable hangers **40**. A pair of brackets **41**, on each end wall of the chamber, are engaged respectively by the pair of adjustable hangers **40** from the respective standard. The adjustment of the hangers **40**, as apparent, makes it possible to position the chamber with its composite bottom wall in parallelism with and spaced closely above the traveling pulp mat.

A very important feature of the composite steam chamber, as previously indicated, is the fact that it can be made, at moderate cost, in as large a size as desired, of relatively light sheet metal without danger of becoming distorted or ruptured during shipment or during use, and also the fact that the composite chamber, when completed, presents no particular maintenance problem. A suitable steam pressure gauge **42** and a vacuum breaker **43** are mounted on one of the end walls, thus the end wall **11** as indicated in FIG. 1.

I claim:

1. A composite elongated steam chamber for discharging steam down on a pulp mat, said chamber consisting of a pair of upright end walls, a pair of bottom side walls connecting said end walls, a rounded top wall extending between said end walls with the bottom edges of said top wall connected to said bottom walls respectively, a plurality of parallel, identical cross plates connecting said side walls, the bottom of said cross plates located above the plane of the bottom edges of said end walls and said side walls, a plurality of parallel, substantially V-shaped troughs extending the entire length of the chamber and forming the bottom of said chamber, notches in the bottom edges of said cross plates to enable said troughs to be properly supported from said cross plates with the top portions of said troughs secured to corresponding edges of the notches in said cross plates, the top edges of adjacent troughs being spaced a slight distance apart to form narrow steam-discharging slots extending the entire length of the chamber, a steam-discharging pipe in said chamber discharging steam under pressure into said chamber, drains for said troughs at said end walls, and means for supporting said chamber in desired position extending transversely above the pulp mat.

2. The composite steam chamber as set forth in claim **1** with bottom extensions on said side walls extending inwardly and upwardly to said cross plates to form a lower and larger trough along each side of the bottom of said chamber, and with the intervening bottom troughs having their bottom lines located in the plane above the bottom lines of said pair of side troughs.

3. The composite steam chamber as set forth in claim **1** with said notches in the bottom edges of said cross plates having enlarged, cut-out portions at the top to prevent said slots between said troughs from becoming clogged where said troughs pass through said notches.

4. The composite steam chamber as set forth in claim **3** with the addition of members engaging the tops of said troughs spaced in between said cross plates and with each of said members having a notch corresponding to the notches in said cross plates.

5. The composite steam chamber of claim **1** with said steam-discharging pipe being perforated and extending substantially the entire length of said chamber, and with supporting means for said pipe mounted on said cross plates.

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S. LEON BASHORE, Primary Examiner

R. V. FISHER, Assistant Examiner

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