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[54] STOCK TANK SEALING MEANS FOR
PAPERMAKING

[72] Inventors: **Heinz Genz**, Willich; **Heinz Liborius**, Duesseldorf; **Dieter Pfleiderer**, Lahnstein; **Karl Schmidt**, Duesseldorf; **Dieter Berger**; **Horst Seeliger**, both of Lahnstein, all of Germany

[73] Assignee: **Feldmuhle Aktiengesellschaft**, Dusseldorf, Germany

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[56]

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Primary Examiner—S. Leon Bashore

Assistant Examiner—Thomas G. Scavone

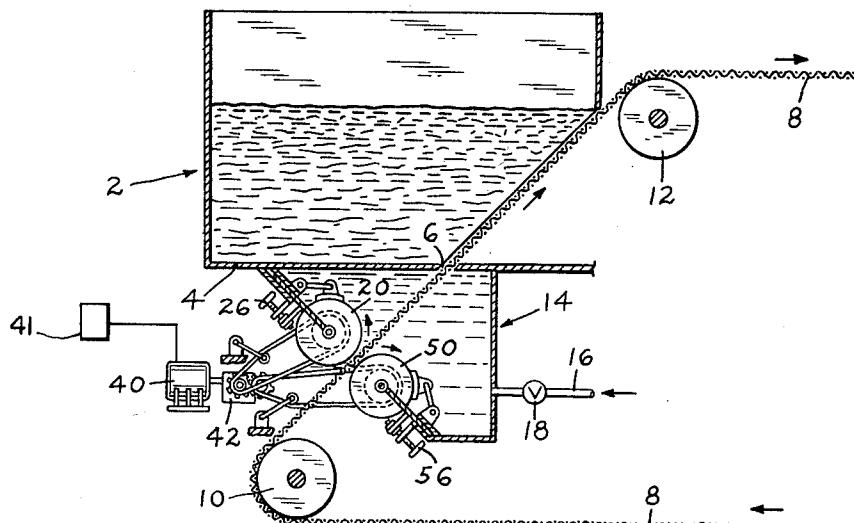
Attorney—Charles B. Smith and John A. Howson

[57]

ABSTRACT

The screen inlet to the stock tank is sealed to prevent loss of stock water by a water chamber. The seal water pressure is adjustable. The chamber is sealed with reference to the screen by two rollers each of which is in close proximity to but not in contact with an opposite side of the screen and is driven in either direction at variable speed. The gap between rollers and screen is adjustable to accommodate different screen gages, different concentrations of fiber suspension, different stock levels and other operating conditions.

7 Claims, 2 Drawing Figures



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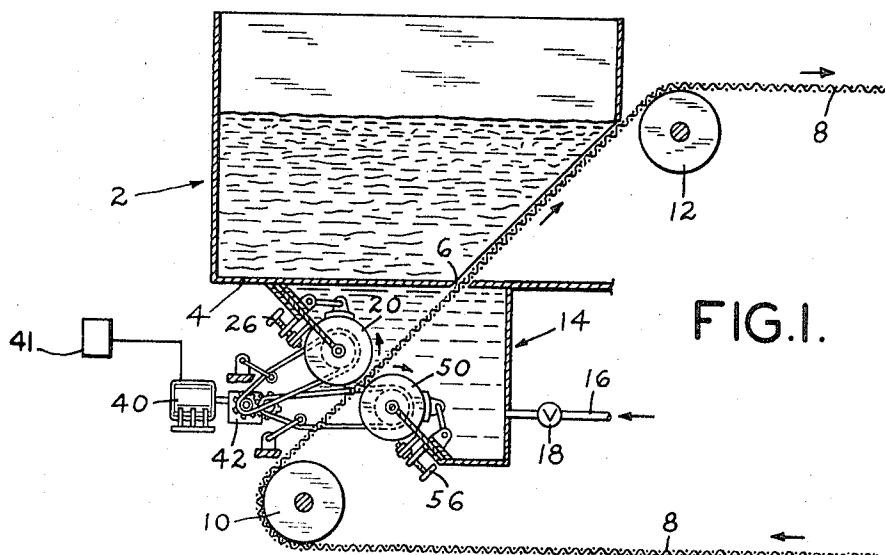
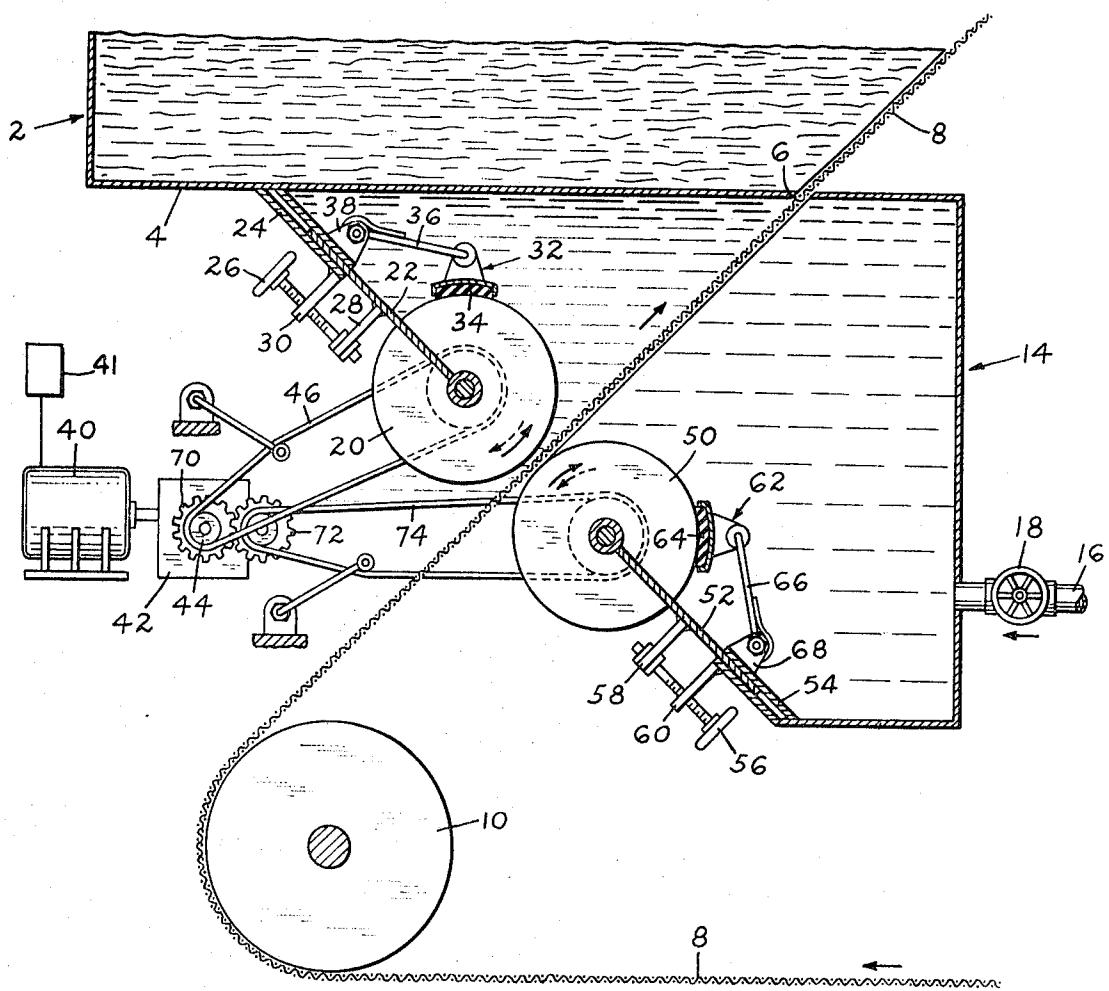


FIG. 2.



STOCK TANK SEALING MEANS FOR PAPERMAKING

This invention relates to a machine for producing non-woven fabric on a paper-making, or paper-making type of, machine and, more particularly, to the sealing of the stock tank where the endless wire or screen, upon which the non-woven fabric is formed, is passed into such stock tank.

Non-woven fabrics are made by a wet process wherein fibers from a fiber-water stock are deposited on a wire, driven endlessly through a stock tank along an inclined path on a paper-making, or paper-making type of, machine. The endless wire screen enters at the bottom of the tank and is discharged from the top of the tank. As the wire screen travels along the inclined path through the tank the fibers are deposited on the wire screen, usually by vacuum.

Because the wire screen enters the stock tank at the bottom of the tank, the tank, where the wire screen enters, must be sealed. Fluid pressure, where the wire screen enters the tank, is relatively high. Attempts, heretofore, to seal such tanks with wire aprons pressed against the wire screen have not been successful because of the wear of the wire aprons on the wire screen and, more important, such aprons tend to extract and accumulate fibers left in the endless wire screen when the web or mat deposited thereon was withdrawn after a prior pass of the wire screen through the tank. Such accumulated fibers on the wire apron become detached and redeposited on the endless wire screen, pass into the stock tank on the endless screen and cause flaws and even tears in the non-woven fabric formed thereon. Such accumulated fibers or fiber lumps may also damage the endless wire screen.

In the instant invention the difficulties heretofore encountered in the sealing of the endless wire screen into the stock tank are avoided by a sealing chamber filled with sealing water and positioned below the stock tank where the endless wire screen enters the tank. In entering the sealing chamber, the endless wire screen passes between two driven rolls, adjustably mounting in opposed relationship to each other, with their opposing surfaces in close proximity to, but not touching, the surface of the screen.

The pressure of the sealing water in the sealing chamber is adjustable. The driven seal rolls are driven in the direction of endless wire screen travel and retain the sealing water in the seal chamber. Preferably, the seal rolls are driven through a variable speed drive so that the speed of the seal rolls might be adjusted to operating conditions, such as, wire screen speed, viscosity of the stock, stock level, level of damming, seal water pressure, and similar conditions.

The seal rolls, rotating in the direction of wire screen travel, in addition to sealing the sealing chamber, also tend to scrub or clean the wire screen and loosen and remove from the wire screen fibers left on the screen during a prior pass of the screen through the stock tank. The fibers removed from the screen by such scrubbing and cleaning are transferred to the stock water through the opening or slot in the bottom of the stock tank at the top of the seal chamber.

Preferably, the direction of drive is reversible so that the seal rolls may be driven in the direction opposite to the direction of the endless wire screen travel. While under normal conditions the seal rolls are driven in the same direction as the endless wire screen and will loosen and remove fibers left in the screen during a prior pass at the screen through the stock tank, should the amount of fibers left on the screen during a prior pass become excessive, the drive of the seal rolls may be reversed to flush seal water out of the seal chamber and along the endless wire screen to clean the screen and discharge the excess fibers.

The invention will be more fully understood from the following description and appended drawings in which

FIG. 1 is a side elevational view, partly in section, of the apparatus of the instant invention; and

FIG. 2 is an enlarged view of the apparatus of FIG. 1.

Referring to the drawings the apparatus of the instant invention includes a stock tank generally designated 2 having a bottom wall 4 with a slot 6 through which endless wire screen 8 driven around rollers 10, 12 passes in the direction of the ar-

rows, FIGS. 1 and 2. Fibers from the fiber-water stock in tank 2 is deposited on endless wire screen 8 as the screen passes through tank 2 and the fibers are drawn onto screen 8 and the water removed by suction boxes, not shown, in the conventional manner.

Sealing chamber, generally designated 14, is mounted on the bottom wall 4 of tank 2 forming, below wall 4 and slot 6 therein, a chamber for sealing water. Sealing water is fed to sealing chamber 14 through pipe 16, the pressure of the sealing water in chamber 14 being controlled by valve 18 in pipe 16. Sealing roll 20 is mounted on adjustable extension 22 of wall 24 of sealing chamber 14. Sealing roll 20 and wall extension 22 are adjustable, toward and away from endless wire screen 8, by adjusting screw 26 connected, at its end, by bracket 28 to wall extension 22 and threaded, intermediate its ends, in brackets 30 fixed to wall 24. Scraper 32, having a scraper pad 34, such as for example, rubber, contacts the surface of seal roll 20 and is spring urged, by arm 36 mounted on bracket 38 on wall 24 into engagement with the surface of seal roll 20. Seal roll 20 is driven in the direction of the arrow, FIG. 2, by motor 40 connected through reduction gear 42, pulley 44 and belt 46 to seal roll 20.

Sealing roll 50 is mounted on adjustable extension 52 of wall 54 of sealing chamber 14. Sealing roll 50 and wall extension 52 are adjustable, toward and away from endless wire screen by adjusting screw 56 connected, at its end, by bracket 58 fixed to wall extension 52 and threaded, intermediate its ends, in bracket 60 fixed to wall 54. Scraper 62, having a scraper pad 64, such as for example, rubber, contacts the surface of seal roll 50 and is spring urged, by arm 66 mounted on bracket 68 on wall 54 into engagement with the surface of seal roll 50. Seal roll 50 is driven in the direction of the arrow, FIG. 2, by motor 40 connected through reduction gear 42, gears 70, 72 and belt 74 to seal roll 50.

In the operation of the apparatus of the instant invention, seal rolls 20 and 50 are adjusted so that the opposing surfaces of rolls 20, 50 are in close proximity to the upper and lower surfaces of endless wire screen 8 but without contact between seal rolls 20, 50 with wire 8 as the wire passes between the rolls. Rolls 20, 50 are driven in the direction of travel of screen wire 8, i.e., as indicated in full line, FIG. 2, by motor 40 through reduction gear 42, the speed of rolls 20, 50 being adjusted so that the flow of seal water through the gap between seal rolls 20, 50 and wire screen 8 are at a minimum. Preferably, the speed of seal rolls 20, 50 is adjusted so that the peripheral speed of such rolls is higher than the linear speed of wire 8. Seal water is introduced into chamber 14 through pipe 16 and the pressure is adjusted through valve 18 so that only a small amount of water passes through gap 6 into tank 2. Ideally, the seal water pressure is adjusted so that the amount of seal water passing into stock tank 2 is at a minimum without allowing the stock to flow from stock tank 2 into seal chamber 14.

During operation, the driving of seal rolls 20, 50 in the direction of linear feed of wire screen 8 throws the seal water in contact with seal rolls 20, 50 upwardly into seal chamber 14. Scraper pads 34, 64 clean the surfaces of seal rolls 20, 50 and act as seals between seal rolls 20, 50 and wall extensions 22, 52, respectively. Scraper pads 34, 64 are mounted in close proximity to walls 22, 52 and, if preferred, may be mounted in the wall extensions and spring urged into engagement with the surface of the rolls.

During normal operation, seal rolls 20, 50 are driven in the same direction as the direction of the linear drive of screen wire 8 and will loosen and remove fibers left on screen 8 from prior passage of such screen wire through stock tank 2. If the amount of fibers left on screen 8 by a prior passage of the screen through the stock tank is excessive, seal rolls 20, 50 may be reversed via a reversing and speed control 41 and the amount of seal water fed to seal chamber 14 through pipe 16 and valve 18 can be increased to flush and remove the fibers from screen 8. Once the excess fibers have been removed from screen 8, seal rolls 20, 50 can again be reversed and the pressure of the seal water in chamber 14 can be readjusted.

The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any equivalents of the features shown and described or portions thereof, but it is recognized that various modifications are possible.

What is claimed is:

1. Apparatus including a stock tank having an opening in one wall which is below the stock level in said tank and an inclined endless wire screen passing upwardly through the opening for producing non-woven fabrics by depositing fibers from water-fiber stock in the tank on the screen as it moves up through the tank and means for preventing the loss of stock water through the opening comprising: a seal chamber around and below the opening for holding sealing water under pressure and sealing means comprising a pair of rolls forming a portion of a wall of the chamber on opposite sides of the screen as it enters the chamber below the stock tank opening, the rolls lying opposite each other in close proximity to but not touching the surfaces of the screen and means connected to the rolls for rotating them in the direction of wire screen travel to retain the seal water in the chamber.

2. Apparatus according to claim 1 wherein the roll rotating

means includes means for rotating the peripheries of the rolls at a faster rate than the speed of travel of the screen.

3. Apparatus according to claim 1 wherein there is a scraper device for each roll defining a wall of the chamber and engaging the surface of its roll for sealing the chamber against the passage of water past the roll.

4. Apparatus according to claim 1 wherein there are means for adjusting the spacing of the rolls from the wire screen.

5. Apparatus according to claim 1 wherein the roll rotating means include means for rotating the peripheries of the rolls at a faster rate than the speed of travel of the screen and there are means for adjusting the spacing of the rolls from the wire screen.

6. Apparatus according to claim 5 wherein there is a scraper device for each roll defining a wall of the chamber which engages the surface of its roll for sealing the chamber against the passage of water past the roll.

7. Apparatus according to claim 6 wherein the means for rotating the rolls in the direction of travel of the wire screen includes means for varying the speed of rotation of the rolls to suit various operation conditions, and means for rotating them in the reverse direction.

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