

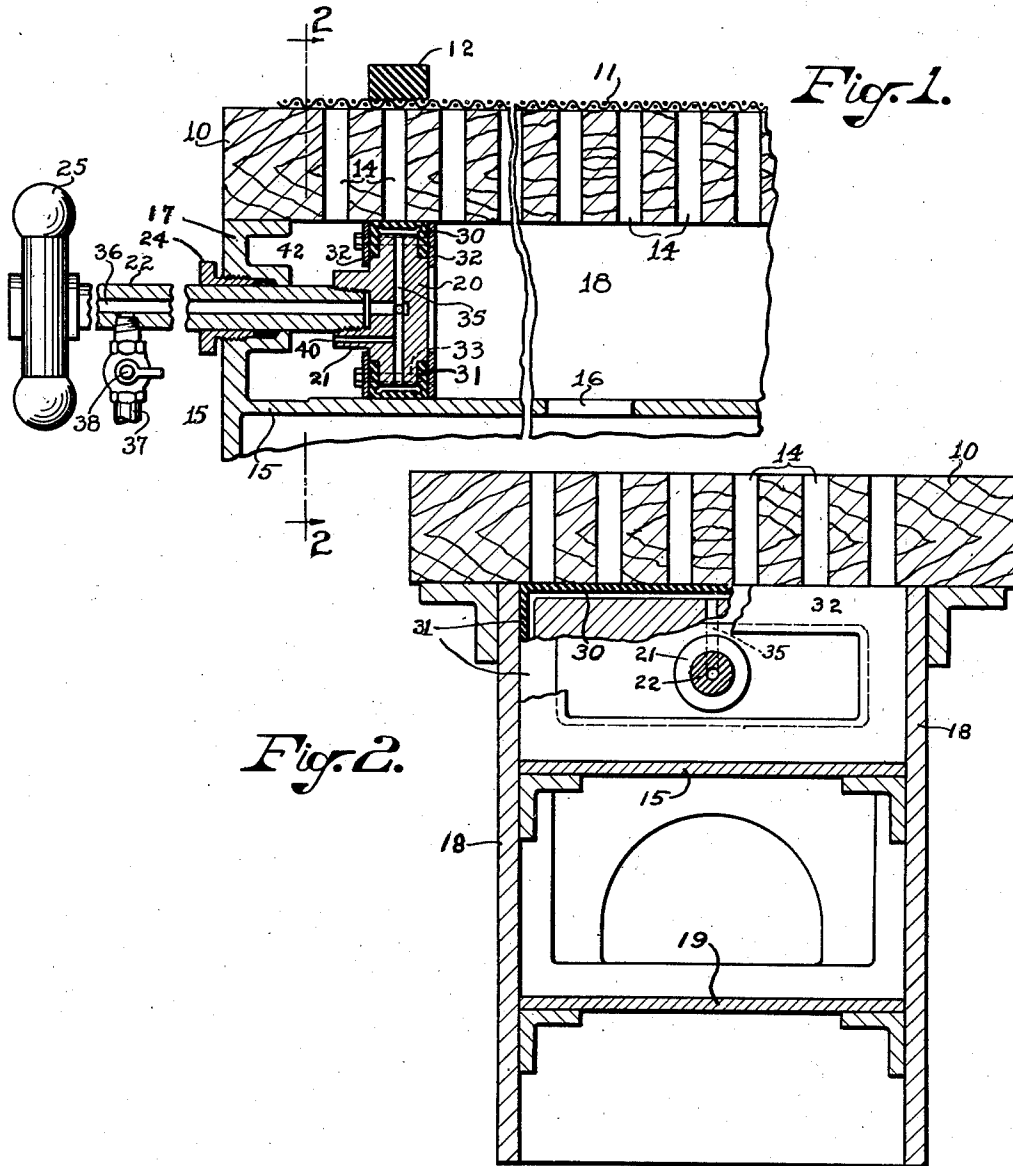
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PAPER MAKING MACHINE SUCTION DEVICE

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PAPERMAKING MACHINE SUCTION DEVICE

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This invention relates to a paper making machine suction device and more particularly to the suction box located beneath the travelling Fourdrinier wire which is arranged for extracting water from the web of paper pulp that is being formed on the wire.

In a Fourdrinier machine, the endless wire on which the paper web is laid travels over the perforated tops of stationary suction boxes which are arranged to withdraw water from the paper pulp web by means of the atmospheric pressure provided by applying suction thereto. If the deckle device on the wire is so adjusted as to make a strip of paper narrower than the wire, then it is necessary to adjust movably positioned end walls in the suction box so that the suction area will be limited to that portion of the travelling wire which carries the paper pulp. In order to maintain proper vacuum conditions in the suction box, it has heretofore been customary to face each movable end wall of the suction box with a heavy compressible rubber strip held between two adjustably mounted clamping plates so arranged that this rubber strip may be compressed and caused to bulge outwardly and so make a closer contact with the inside walls of the suction chamber and the under side of the perforated cover of the suction box. It is found, however, that this compressible rubber strip is not sufficiently elastic to provide a satisfactory seal for many conditions of usage, and that it gradually becomes permanently distorted. In this condition it is not easily adjustable and it becomes increasingly difficult to provide a satisfactory seal.

The primary object of this invention is to overcome such problems and to provide a paper making machine suction box having movable end walls arranged to be adjusted to positions conforming with those of the deckle straps on the Fourdrinier wire above and to insure a satisfactory seal under the various conditions of usage. A further feature and object of my invention is to provide a suction box with movable end walls having deckle rubbers which are expanded and held in position by hydraulic pressure and wherein water is supplied to wet the unused portions of the suction box cover. This water further aids in preventing air from being sucked into the vacuum chamber. Further objects of this invention will be apparent in the following disclosure.

In accordance with my invention, I employ a hollow, elastic, inflatable body to form the desired seal; and by means of a manually controlled fluid pressure mechanism I inflate that body into a sealing contact with the four adjacent walls of

the suction box. Furthermore, I employ water to inflate the seal and an excess of this water is caused to flow outwardly and upwardly into that portion of the box to which the vacuum is not applied and thus wet and lubricate the cover under the moving wire and further aid in maintaining the seal.

Referring to the drawing which illustrates a preferred embodiment of this invention:

Fig. 1 is a vertical cross sectional view, partly broken away, of a suction box arranged with a Fourdrinier wire; and

Fig. 2 is a fragmentary section on the line 2—2 of Fig. 1.

Referring to the construction shown in the drawing, a suction box, which may be of standard construction except as herein defined, may comprise a perforated cover 10 of wood or other suitable material over the top face of which the Fourdrinier wire 11 travels with a sliding contact. An adjustable deckle strap 12 of rubber or other suitable material travels with the wire and defines the width of the paper web. The passages 14 in the cover provide for the removal of water from the paper pulp on the wire thereabove. The bottom 15 of the suction box has a central opening 16 through which water is removed into a passage beneath. The ends 17, which may be integral with the bottom, form with the side walls 18 a suction chamber beneath the wire. A further chamber is formed below the suction box by cooperating walls 19, and a suitable communication with suction apparatus may be provided in accordance with standard procedure so as to exhaust air from the suction box and withdraw water from the paper pulp on the wire.

The present invention pertains to the construction of movable end walls or deckles for the suction box which may be adjusted to desired positions so as to correspond with the location of the web of paper above the wire. These movable walls are located between the two end walls 17 and adapted to be adjusted to required positions. Each of these movable walls (only one being illustrated) comprises a body 20 made of metal, or other suitable material, which is arranged to be movably positioned as desired. The wall 20 is rectangular in shape, corresponding with but smaller than a cross section of the suction box. It has a boss 21 projecting outwardly from its central portion, and this boss is threaded onto the end of a pipe 22 or hose which serves to position the wall as required. The pipe 22 passes through a suitable opening in the end wall 17 and the water is prevented from passing by means

of a suitable gland and packing 24. A handle 25 is affixed to the outer end of the pipe 22. The pipe 22 is slidably fitted in place so that it may be moved in and out to position the wall 20 wherever required.

In accordance with my invention, I provide a seal between the perimeter of each movable end wall 20 and the perforated cover 10, the bottom wall 15 and the side walls 18 of the suction box. This seal is formed of a flexible elastic strip 30 made of rubber or other suitable expansible material which is shaped as an endless band fitted loosely over the four walls of the slidable wall 20. The rubber strip 30 is made sufficiently wide so that it has side portions 31 contacting with the front and rear faces of the slidable wall 20 as illustrated. The strip 30 is held in position by means of two metal clamp plates 32 which are suitably held by bolts 33 passing through the wall 20. These clamp plates preferably fit fairly snugly against the surrounding walls of the suction box so as to scrape off any wood pulp or sludge that may cling there. The clamp plates fit tightly against the inwardly projecting portions of the rubber web 30 and form tight seals therewith. The rubber strip is spaced materially from the perimeter of the movable wall 20 so as to provide ample room for fluid under pressure therebetween.

Fluid, such as water, is admitted under pressure into the annular space between the expansible strip 30 and the perimeter of the movable wall 20. For this purpose, the wall is provided with suitable passages 35 which communicate with a central bore 36 within the push and pull pipe rod 22. The water is introduced through the pipe 37 under pressure and the flow may be controlled by a three way valve 38 of desired construction.

The movable decking wall 20 may be adjusted to a desired position by means of push and pull rod 22 while the fluid pressure is off. Then by suitably controlling the valve 38, water is introduced into the annular space between the movable wall 20 and the inflatable rubber strip 30. This inflates the strip outwardly against the various associated walls to form a seal therewith.

One or more small holes 40 are provided to lead from a passage 35 to the space 42 between the walls 17 and 20. This provides a slight outward leakage of water into the outer space so as to fill the same. This water overflows upwardly through the cover 10 and thus lubricates the passage of the traveling wire over that part of the box cover which is not kept wet by the water drawn downwardly from the paper pulp. The water in the space 42 also aids in making a seal around the movable wall 20.

The operation of the device will be apparent in the above disclosure. The movable inner wall may be adjusted as desired from outside of the suction box while the fluid pressure is off. Thereafter, fluid may be admitted through the valve to inflate the sealing member and hold it tightly against the four adjacent walls of the suction box and particularly the perforated top thereof. By maintaining a suitable head of water pressure, the seal is held in position for as long as desired; and the water supply will, of course, be adequate to permit the desired leakage through the passage 40 which fills the outer space outside of each of the two end walls. The inflatable member may be made of many types and shapes of elastic material, such as a continuous

tube of soft rubber, either natural or synthetic, containing suitable ingredients well known to the rubber chemist which provide a strong, durable and permanently elastic medium. It is preferable that this strip or tube be a single continuous piece and not made of separately movable elements, so that there will be no leakage at the corners and the inflatable body will make a perfect seal around the entire periphery of the inner movable wall.

Various modifications may be made in this construction in the light of the above disclosure, and the specification and drawing are to be interpreted as illustrating the principles of the invention and the preferred embodiment thereof and not as limitations on the claims appended hereto.

I claim:

1. In a paper making machine having an endless wire on which a paper web of variable width is laid, a stationary suction box comprising a perforated top over which the wire travels and walls defining the sides and bottom of a suction chamber, a movable end wall for the suction chamber, means for adjusting the position of the end wall, an expansible sealing member surrounding the periphery of the wall and forming an annular fluid space, and means for admitting fluid under pressure into said space which includes a pipe line connected with an external fluid source outside of the suction box for inflating the sealing member into sealing contact with the top, sides and bottom of the box irrespective of pressure conditions within the suction chamber.

2. In a paper making machine having an endless wire on which a paper web of desired width is laid, a stationary suction box comprising a perforated top over which the wire travels and walls defining the sides and bottom of a suction chamber, a movable end wall for the suction chamber having an opening from its outer side communicating with its periphery, a pipe for conducting fluid under pressure from an external source to said opening, an expansible sealing member surrounding the periphery of the end wall which forms an annular fluid space, and means for admitting said fluid under pressure to said pipe and inflating said member into contact with the top and adjacent walls of the suction box irrespective of the pressure within the chamber.

3. In a paper making machine having an endless wire on which a paper of variable width is laid, a stationary suction box comprising a perforated top over which the wire travels, side and bottom walls and outer end walls having openings therethrough, a pair of inner movable end walls spaced materially from said top, bottom and sides, each movable end wall having an opening from its outer side communicating with its periphery, a pipe passing through the opening of each outer end wall which is connected to the adjacent movable wall for moving the same and which communicates with the passage therein, an expansible sealing member surrounding the periphery of the movable end wall and forming an annular fluid space, and means for admitting fluid under pressure from an external source to said pipe and expanding said member into sealing contact with the associated parts of this suction box.

4. In a paper making machine having an endless wire on which a paper web of variable width is laid, a stationary suction box comprising a

perforated top over which the wire travels and stationary end walls, sides and bottom defining a suction chamber, a movable inner end wall for the suction chamber which is spaced materially at its periphery from the associated walls of the suction box, an inflatable sealing member surrounding the periphery of the movable end wall and defining an annular fluid space, the movable wall having a passage from its outer side communicating with said fluid space, means including a pipe communicating with an outside fluid source for admitting fluid under pressure to said fluid space and inflating said member into sealing contact with the adjacent walls of the box, and means for admitting fluid between the stationary and the movable end walls and thereby filling the space in the box outside of the suction chamber.

5. In a paper making machine having an endless wire on which a paper web of variable width is laid, a stationary suction box comprising a perforated top wall over which the wire travels,

and outer end walls, sides and bottom defining a suction chamber, said end walls having openings therethrough, a movable inner end wall within the box adjacent to each outer end wall and which is materially spaced from the top, bottom and sides of the box, an expansible sealing strip fitting over the two sides and periphery of the movable wall and forming with the latter an annular fluid space, said inner wall having a fluid passage communicating from its outer side to said space, clamping plates on opposite sides of the movable wall which engage and secure the sealing strip in position, said plates slidably engaging the box for scraping sludge therefrom, and a pipe passing through the opening in the outer wall which is secured to the inner wall and communicates with said passage for admitting fluid under pressure thereto from an external source and inflating the strip into sealing contact with the associated walls of the suction box.

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