Dec. 20, 1960 S. M. SALOMON 2,965,314

FLUID INLET DEVICE

Filed June 6, 1956

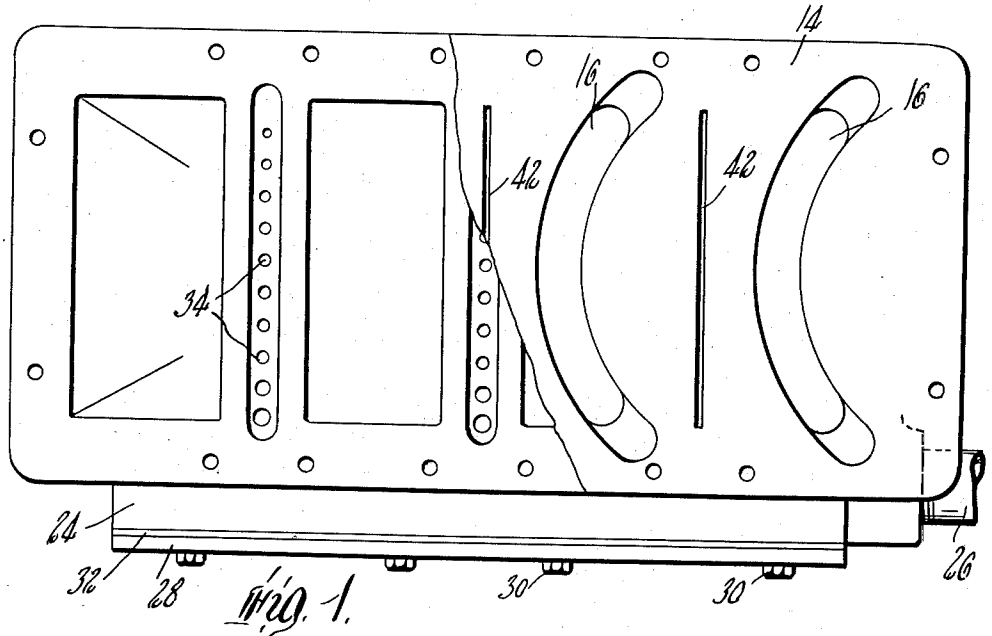

Fig. 1.

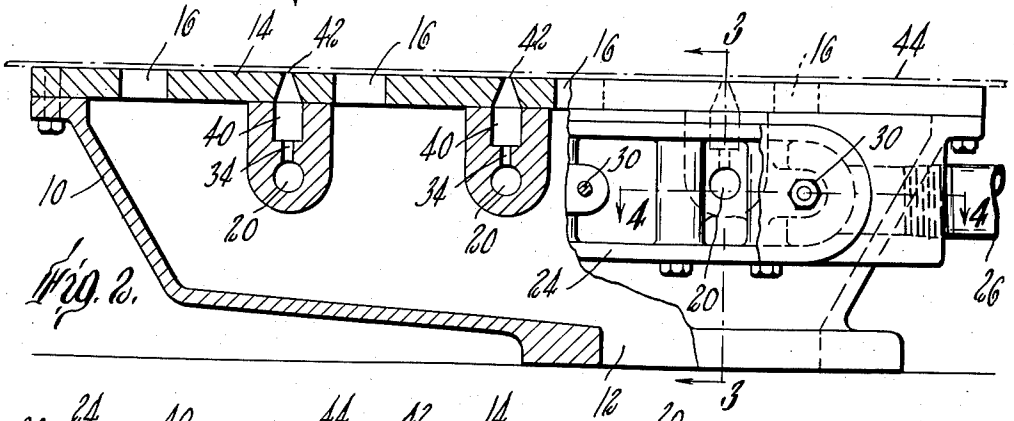

Fig. 2.

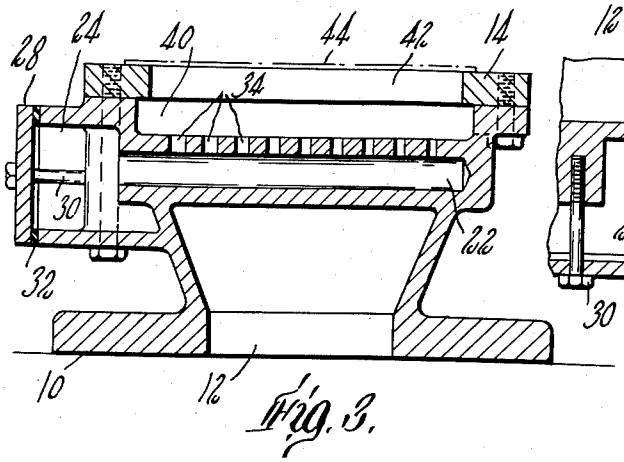

Fig. 3.

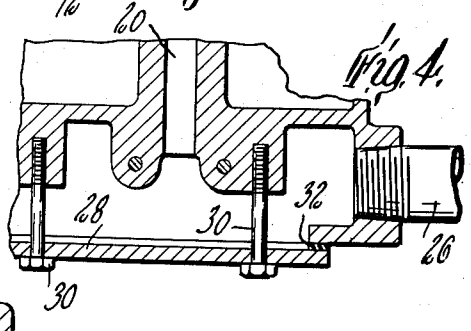

Fig. 4.

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FLUID INLET DEVICE

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4 Claims. (Cl. 239—597)

This invention relates to apparatus for cleaning and conditioning the wires and felt belts of paper making machines and for coating paper and pertains more specifically to an improved felt conditioning device of the type adapted to eject a stream of cleaning fluid against the felt.

One object of the invention is to provide a device of the type described having an improved fluid delivery construction.

Another object is to provide such a device which is arranged to supply a fluid jet of elongated cross-sectional configuration having a substantially uniform fluid velocity throughout.

A further object is to provide an improved water-feed construction for a suction box adapted to clean and condition the felt belts of paper making machines.

Other and further objects will be apparent from the drawing and from the description which follows.

In the drawing:

Fig. 1 is a plan view, partly broken away, showing one embodiment of the invention;

Fig. 2 is a view in side elevation, partly broken away and in section;

Fig. 3 is a view in section taken along the line 3—3 of Fig. 2; and

Fig. 4 is a view in section taken along the line 4—4 of Fig. 2.

In a preferred embodiment as shown in the drawing the device includes a suction box **10** having an outlet **12** in its bottom through which suction may be applied by any conventional means such as a vacuum pump. A cover plate **14** is bolted to the upper open face of box **10** and is provided with a plurality of suction openings **16, 16** communicating with the interior of box **10**.

Box **10** is also provided with a plurality of elongated passages **20, 20** each of which is closed at one end **22**, as seen in Fig. 3, and opens at its opposite end into a manifold or header **24** to which water or other washing fluid may be supplied through pipe **26** opening into one end of header **24**. Water, steam or any other suitable fluid may be supplied under pressure from any suitable source. Header **24** is provided with a separate cover plate **28** held in place by means of bolts **30, 30** which are threaded into box **10**, as seen in Fig. 4. A sealing gasket **32** may be provided to ensure adequate sealing around the margin of cover plate **28**.

Passages **20, 20** are provided with a plurality of spaced aligned apertures **34, 34** along their upper walls, the apertures being graduated in size from the inlet end of passage **20** to the terminal or closed end **22**, the smallest aperture being adjacent closed end **22**. Each row of apertures **34** opens into an elongated chamber **40**, the upper portion of which is formed by cover plate **14** and tapers in cross-sectional configuration adjacent its upper end to an elongated slot aperture **42** which is approximately equal in length to the length of the row of aligned apertures **34, 34** and which has a width less than that of the smallest aperture **34**. Each chamber **40** and its

corresponding passageway **20** together form a conduit for supplying a stream of water or other fluid through slot **42**.

In the operation of the preferred embodiment cover plate **14** lies beneath the porous sheet **44** such as a felt belt or Fourdrinier wire (Fig. 2) which is to be cleaned and conditioned, the belt or wire advancing across the top of cover plate **14** from right to left as seen in Figs. 1 and 2 with each passage **20** and chamber **40** extending transversely to the direction of travel of the belt. As the belt advances, being held closely against the face of cover plate **14** by the suction applied through suction openings **16, 16** from the interior of suction box **10**, water, steam or any other suitable fluid is introduced under pressure through pipe **26**, being distributed through header **24** into the several passageways **20, 20**. As the water advances through passageways **20** toward the closed end **22** thereof, a portion of the water is forced upwardly through apertures **34, 34** toward belt **44**. Surprisingly enough, despite the graduation in size of apertures **34, 34** the velocity and volume (rate of flow) of the stream of water ejected through each of them is substantially the same.

The streams of water passing into chamber **40** are directed by the converging walls of the chamber into slot apertures **42, 42**. Because the width of elongated slot aperture **42** is less than the diameter of the smallest orifice **34** and the cross-sectional area of the slot is less than the total area of all the orifices **34, 34**, the streams of water are merged to issue from slot apertures **42, 42** in the form of a stream or sheet of fluid which is substantially continuous lengthwise of the slot and of substantially uniform velocity therealong.

As each portion of the belt advances from each slot aperture **42** to the adjacent suction opening **16**, the water or steam first is forced into the felt, then is withdrawn therefrom by the suction. Accordingly, the belt is subjected to a cleaning and conditioning treatment which is substantially uniform widthwise of the belt because of the uniform velocity of the stream of washing fluid along its length.

It will be understood that the fluid inlet construction of the present invention is adapted to be used either with or without a suction box and that the precise shape and arrangement of suction openings forms no part of the present invention. The device is useful with either cylinder or Fourdrinier paper making machines. In addition, the belt or wire may be spaced from apertures **42, 42** instead of being in contact with or immediately adjacent to cover plate **14**. The device of the present invention may also be used for applying fluid such as a coating liquid to the paper formed on the paper making machine.

Although specific embodiments of the invention have been described herein, it is not intended to limit the invention solely thereto, but to include all of the obvious variations and modifictions within the spirit and scope of the appended claims.

I claim:

1. Apparatus for cleaning and conditioning an advancing felt belt or wire of a paper making machine comprising an elongated passageway of uniform diameter along its length having one end closed and having a plurality of spaced aligned apertures along its wall, said apertures being graduated in size with the smallest adjacent said closed end, means for introducing cleaning fluid under pressure into the other end of said passageway to provide a plurality of jets of fluid of substantially uniform velocity flowing outwardly through said apertures and an elongated chamber disposed adjacent said passageway with said apertures opening into one side of the chamber, the chamber having a slot along its side

opposite said apertures, said slot having an area less than the total area of all the apertures to provide a sheet of fluid issuing through said slot of substantially uniform velocity from end to end of said slot.

2. Apparatus for cleaning and conditioning an advancing felt belt or wire of a paper making machine comprising a plurality of spaced, substantially parallel, elongated passageways, a manifold communicating with one end of each of said passageways for supplying cleaning fluid under pressure thereto, the other end of each passageway being closed, each passageway having a row of spaced orifices along its top, said orifices being graduated in size with the smallest adjacent said closed end, an elongated chamber disposed adjacent each said passageway and having said orifices opening into its bottom, each said chamber tapering in cross-sectional configuration adjacent its top to an elongated slot aperture, the length of said slot aperture being substantially equal to the length of said row of orifices and the area of said slot aperture being less than the total area of all the orifices to provide an upwardly directed sheet of fluid issuing through each said slot of substantially uniform velocity along the length of said slot.

3. Apparatus for cleaning and conditioning an advancing felt belt or wire of a paper making machine which comprises an elongated conduit closed at one end, means for supplying washing fluid under pressure to the other end of said conduit, an elongated slot orifice extending along a wall of said conduit, and means within said conduit for substantially equalizing the velocity of the stream of fluid issuing through said slot orifice along the length thereof, the last said means comprising a wall

having a row of spaced apertures of graduated size parallel to said slot orifice, the largest aperture being adjacent the water supply end of the conduit.

4. In a suction box for cleaning and conditioning the felt belt or wire of a paper making machine, water jet ejecting means comprising an elongated conduit closed at one end, means for supplying water under pressure to the other end of said conduit, an elongated slot orifice extending along a wall of said conduit, and means within said conduit for substantially equalizing the velocity of a stream of fluid issuing through said orifice along the length thereof, the last said means comprising a wall having a row of spaced apertures of graduated size parallel to said slot orifice, the largest aperture being adjacent the water supply end of the conduit.

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