

Oct. 13, 1931.

W. R. THOMSON

1,827,177

PAPER MAKING MACHINE

Filed Oct. 20, 1928

2 Sheets-Sheet 1

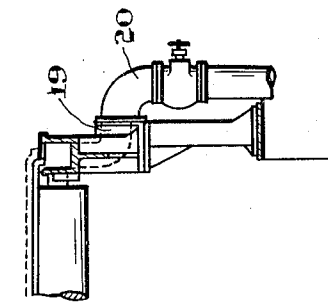


FIG. 2

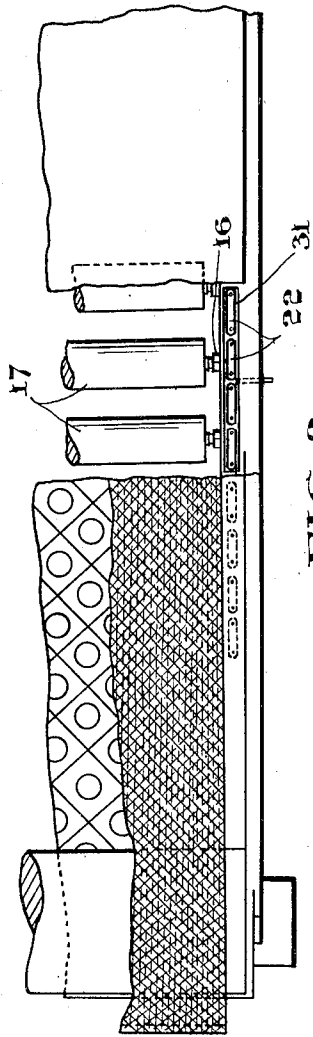


FIG. 3

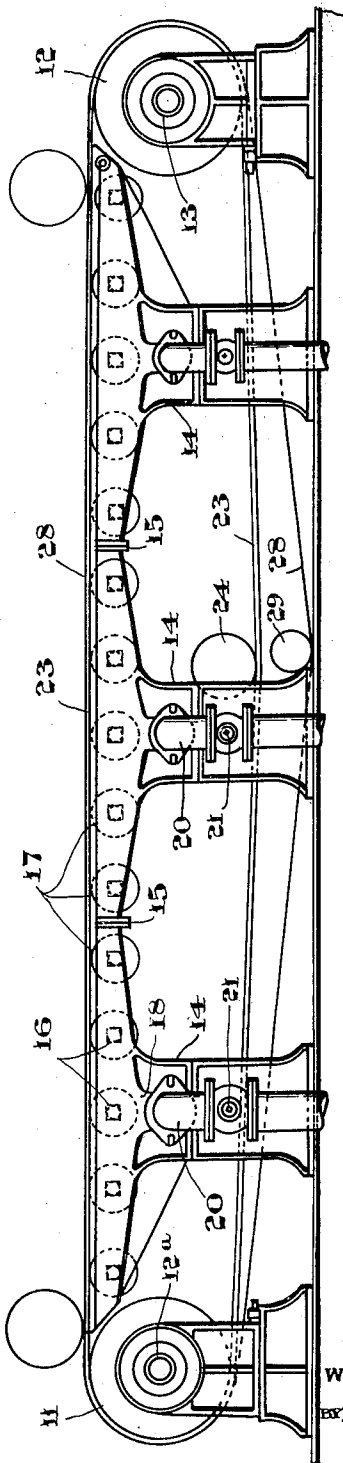


FIG. 1

INVENTOR
WILLIAM R. THOMSON
BY *Fletcher & Haugh*
ATTORNEYS

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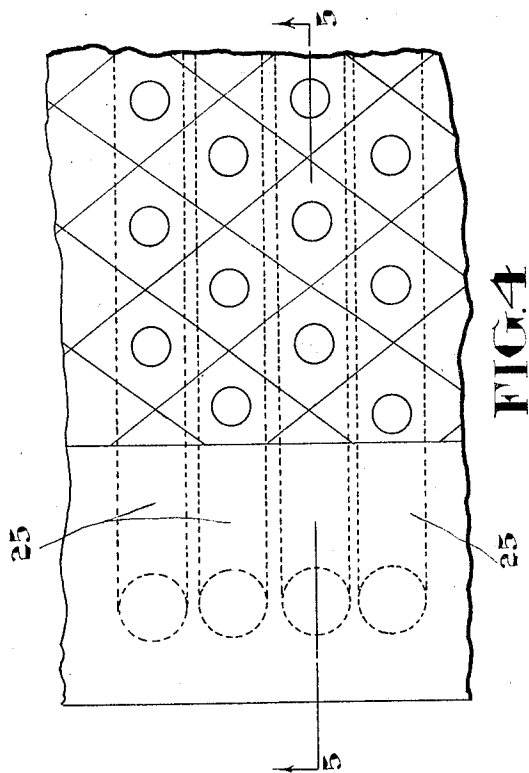


FIG. 4

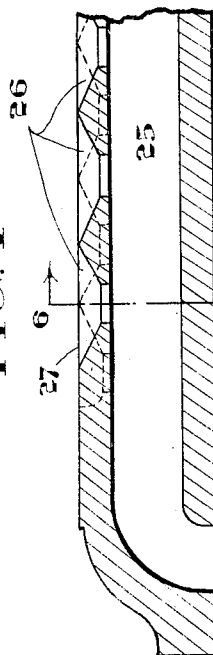


FIG. 5

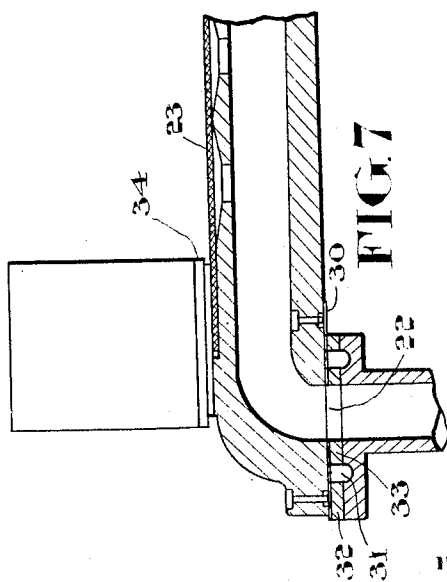


FIG. 7

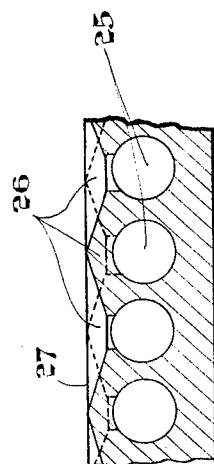


FIG. 6

INVENTOR
WILLIAM R. THOMSON

BY *Leister & Haug* *Attorneys*
ATTORNEYS

UNITED STATES PATENT OFFICE

WILLIAM R. THOMSON, OF WESTMOUNT, QUEBEC, CANADA

PAPER MAKING MACHINE

Application filed October 20, 1928. Serial No. 313,794.

This invention relates to new and useful improvements in paper making machines and particularly to the Fourdrinier or wet end thereof, and the objects of the invention are to provide means which will evenly distribute the suction under the entire stock surface of the wire; reduce the frictional contact of the wire to a minimum, thereby increasing the life of same; to provide means which will allow quick dismantling and replacement of various parts of the machine; and means to eliminate the stationary suction boxes and suction couch roll under the wire which is usually employed in machines of this class.

According to my invention I provide a flexible perforated suction mat of the endless type which is adapted to travel with and at the same speed as the wire. The mat contacts with the underside of the wire and extends over the entire stock supporting surface of the wire. The mat is provided with channels which communicate with the perforations, and with openings forming in the side frames of the machine which are provided with suction chambers. The side frames rotatably support the table rolls which are positioned beneath and contact with the under side of the mat; means are also provided for sealing the mat at its side edges where it contacts with the frame.

In the drawings which illustrate one form of my invention:—

Figure 1 is a side elevation of my improved section of a paper making machine.

Figure 2 is a part sectional end view of the machine shown in Figure 1.

Figure 3 is a fragmentary plan of the machine with parts removed to clarify the construction of same.

Figure 4 is a part plan view of my improved suction mat.

Figure 5 is a sectional elevation of part of the mat taken on the line 5—5, Figure 4.

Figure 6 is a sectional end elevation of the mat taken on the line 6—6 Figure 5.

Figure 7 is an enlarged sectional view of the edge of the suction mat of the deckle strap and the frame.

Referring more particularly to the drawings, 11 and 12 designate the end rolls of the

machine and are rotatably mounted in the bearings, 13 and 12a respectively. Extending between the bearings and on each side of the machine are the side frame members 14, which may be coupled together by any suitable means at the flanges 15. The side members have bearings 16 formed in the side thereof for rotatably supporting the table rolls 17 which extend transversely of the machine. Formed in the said members 14 are the suction chambers 18 which have each an opening 19 communicating with suction pipes 20 which are connected to a source of suction (not shown). Control valves 21 are mounted in the suction pipes to regulate the degree of suction in the chambers. Slots 22 are formed in the upper surfaces of the frames and these slots form inlets to the suction chambers.

An endless mat 23 of flexible material is stretched around and between the end rolls and a suitable tension roll 24 is provided contacting with the underside of the mat to tighten same.

This mat is of special construction and a detail of same is shown in Figures 4 to 6 inclusive. The mat has a plurality of closely pitched chambers 25 which extend transversely on the mat. These channels terminate at the sides of the mat, in downwardly projecting apertures and are so positioned that when the machine is in operation they will register with the slots in the side frames. The edges of the mat rest on the side frames and the lower face of the mat rests on the table rolls which are positioned close together to reduce the mat deflection to a minimum. The mat is provided on one surface with a plurality of closely spaced apertures 26 which communicate with the suction channels. These apertures are preferably made flaring outwardly towards the surface 27, so that ridges are formed between the adjacent apertures. These ridges are preferably but not necessarily made as shown in the details, that is, extending diagonally across the mat, and presenting a supporting surface for the wire. The upper edges of the ridges in cross section are preferably pointed as shown to prevent stock from adhering thereto and also to allow the suction through the mat to be evenly dis-

tributed over the wire 28 resting on the mat, and carrying the paper stock.

The wire is of the usual endless type used in machines of this class and passes around the end rolls and part of the mat in contact therewith. The wire is tensioned by means of the tensioning roll 29.

To prevent undue wear on the part of the mat which contacts with the frame, flexible belts 30 of tempered steel are secured to the mat at the sides thereof.

The inlet ports or slots 22 as shown in Figure 7 are each formed with a surrounding slot 31 into which water is pumped or forced through any suitable channels. The water contacts with the underside of the suction mat and forms an efficient means to prevent air from being sucked through between the underside of the mat and the frame. The water also acts as a lubricant to prevent undue wear between the contacting faces of the steel belts and the framing members.

Renewable strips 32 and 33 of any desired width may be placed between the belts and the frame. These strips may be easily moved and replaced should the wear on them become excessive. Deckle straps 34 may be mounted above and in contact with the mat. These straps are of the usual construction and may be moved transversely of the wire to govern the width of the paper sheet thereon. The operation of the device is as follows:—

Stock is fed on to the wire in the usual manner and the surplus water drains through or is sucked through the wire. The suction mat is preferably mounted so that suction may be applied over the entire area between the end rolls. Suction is applied through the suction chambers on the framing members and the water extracted from the stock is drawn through the sheet, through the wire, through the apertures and enclosed channels in the mat into the said chambers.

By providing valves in the suction pipes connected to the chambers, the suction can be regulated in each chamber or any number of same. The mat supports the wire evenly across its area and the small ridges between the apertures do not interfere with the application of the suction to the sheet over the entire area in contact with or in close proximity to the wire. The wire travels with the mat so that there is practically no wear on the wire.

It will also be seen that the wire can be quickly replaced by removing the light framing members, and the roll bearings on one side of the machine. The wire is slackened and drawn from the machine. The water sealing means around the suction inlet ports in the frames ensure an efficient seal for the mat as well as providing a lubricant which reduces the wear on the mat to a minimum. The machine is economical in operation and maintenance.

In the drawings, the wire is shown passing around the end rolls, but it will readily be understood that the wire may extend beyond the end rolls shown and may be driven from any suitable source and at the same speed as the mat.

Having thus described my invention what I claim is:—

1. In a Fourdrinier machine, a suction mat having a plurality of internal channels extending substantially in the transverse direction of the mat and a plurality of apertures arranged in zig-zag fashion on one side of the mat and communicating with the channels, said apertures flaring outwardly from the channels and forming pointed ridges between the apertures.

2. In a Fourdrinier machine, a suction mat having a plurality of internal transversely extending channels terminating at the sides of the mat in downwardly extending apertures and a plurality of apertures extending upwardly from the channels and flaring outwardly therefrom forming pointed ridges between the apertures.

3. In a Fourdrinier machine, a suction mat having a plurality of internal channels extending substantially in the transverse direction of the mat and terminating at the sides in downwardly extending apertures and a plurality of apertures extending upwardly from the channels and flaring outwardly therefrom, said apertures being arranged in zigzag fashion forming diagonally disposed ridges between the apertures.

4. In a Fourdrinier machine, an endless mat having internal channels formed therein terminating at the sides in downwardly projecting apertures, said mat having a plurality of apertures extending upwardly from the channels, guide rolls for said mat, side frames having suction chambers formed therein adapted to register with the downwardly projecting apertures in the mat, and a stock supporting wire in contact with the mat and adapted to travel therewith.

5. In a Fourdrinier machine, a flexible resilient endless mat having internal channels extending in the transverse direction of the mat and terminating in downwardly projecting apertures in proximity to the edges of the mat, said mat having a plurality of upwardly extending apertures flaring outwardly from the channels, guide rolls for said mat, side frames extending between same and provided with suction chambers communicating with the downwardly projecting apertures in the mat, means to control the degree of suction in said chambers and a stock supporting wire contacting with the mat and adapted to travel therewith.

6. In a Fourdrinier machine, a flexible endless resilient mat having internal channels formed therein, said channels terminating in downwardly projecting apertures in proxim-

ity to the edges of the mat, and said mat having a plurality of apertures extending upwardly from the channels, guide rolls for said mat, side frames extending between the rolls and provided with suction chambers, each of said chambers having a plurality of ports adapted to register with the downwardly projecting apertures in the mat, water sealing means surrounding said ports and a stock supporting wire contacting with the upper side of the mat and adapted to travel therewith.

7. In a Fourdrinier machine, a flexible endless mat of resilient material, having internal channels formed therein terminating at the sides in downwardly projecting apertures, said mat having apertures projecting upwardly from the channels, and wear belts of flexible material secured to the edges on the underside of the mat.

8. In a Fourdrinier machine, an endless suction mat of resilient material, said mat having apertures positioned on the bottom side near the edges thereof, and also apertures formed on the upper side communicating with the side apertures, a band of flexible material secured to the under side, said band having apertures registering with the apertures in the lower side of the mat, guide rolls for said mat, an endless stock supporting wire contacting with the mat, side frames having suction chambers formed therein, said chambers having ports adapted to register with the apertures on the underside of the mat, water sealing and lubricating means surrounding said ports.

9. A Fourdrinier machine according to claim 8, having table rolls rotatably mounted on the side frames below the suction mat.

10. In a Fourdrinier machine, a flexible resilient mat having a plurality of apertures on its upper side communicating with apertures on the underside through internal channels, said underside channels being positioned near the edges of the mat, the apertures on the upper side to be spaced from one another in the longitudinal and transverse directions of the mat, and endless stock supporting wire, contacting with the upper side of the mat, guide rolls for said mat, side frames extending between the guide rolls and provided with suction chambers, said chambers having ports adapted to register with the apertures on the underside of the mat and to provide means for distributing the suction over the stock supporting surface of the wire above the mat, water sealing and lubricating means between the mat and the frame and surrounding the ports, and means to vary the degrees of suction in the chamber.

11. In a Fourdrinier machine, an endless suction mat of flexible resilient material having a plurality of internal channels formed to lie between the top and bottom surfaces

of the mat, said channels extending substantially in the transverse direction of the mat and a plurality of apertures formed in one surface of the mat and communicating with said internal channels.

12. A suction mat according to claim 11 in which the apertures are flared outwardly towards the apertured surface of the mat.

13. In a Fourdrinier machine, opposed frame members having chambers formed therein and spaced inlet openings therefor, a suction mat movable over said frame members and formed with internal transversely arranged channels terminating at the sides of the mat in downwardly extending apertures adapted to register with said inlet openings of said chamber during the travel of the mat, suction pipes communicating with said chambers directly beneath said inlet openings, the upper surface of the mat having outwardly flared apertures communicating with said channels, and said frame members having water receiving grooves surrounding said inlet openings of the chambers to provide an air sealing means with the bottom of the mat.

In witness whereof, I have hereunto set my hand.

WILLIAM R. THOMSON.