Aug. 6, 1935. J. W. HEMPHILL 2,010,150

PAPER MACHINE

Filed April 5, 1934

Fig. 2

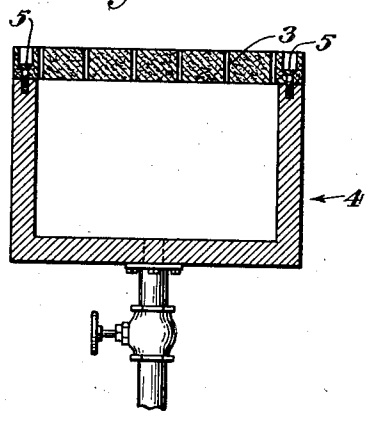


Fig. 1.

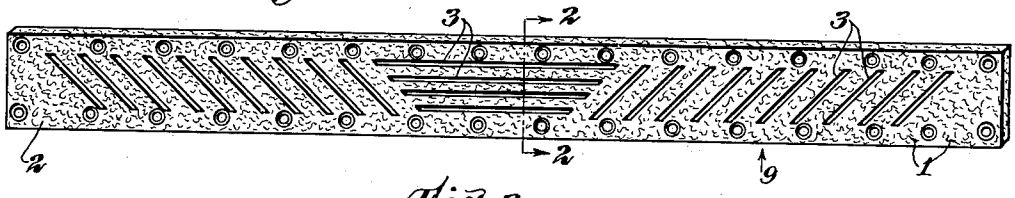


Fig. 3.

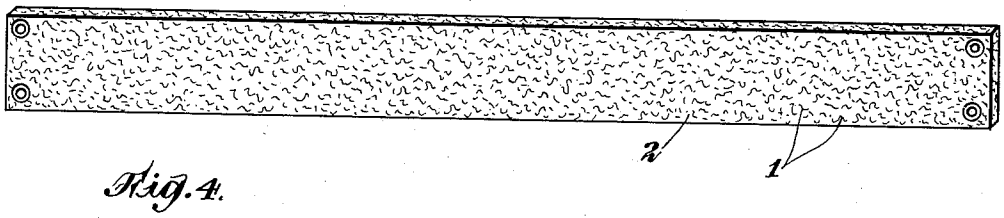
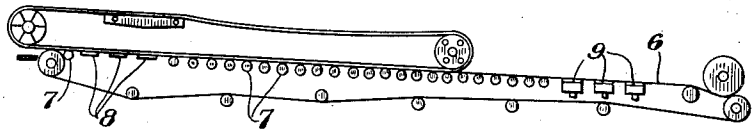


Fig. 4.



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PAPER MACHINE

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Application April 5, 1934, Serial No. 719,087

5 Claims. (Cl. 92—51)

This invention relates to an improved paper machine and particularly to plates adapted to contact with the lower side of a moving member carrying wet paper stock.

The invention will be illustrated particularly by reference to a paper making machine using a Fourdrinier wire conveying the wet paper stock over forming tables or plates and suction boxes. It should be understood, however, that the invention is also applicable to corresponding steps in making paper on other machines.

In making paper on a Fourdrinier machine, suitable fibres are first dispersed or beaten in water to form the paper stock. The stock is screened and then flowed on to the upper reach of the screen belt constituting the conventional Fourdrinier wire. As the upper reach of the wire progresses, in direction away from the position of feeding of the paper stock thereto, the wire may pass over imperforate plates known as water tables or forming boards. These elements of board-like shape are imperforate They delay somewhat the rate of drainage of water from the wet stock on the Fourdrinier wire and make possible more desirable felting of the fibres.

As the wire progresses further and water is drained from the stock, the wire passes over one or more suction boxes which are disposed below the wire and have surface elements or covers in frictional contact with the under side of the wire, whereby suction is applied which accelerates the removal of moisture from the wet stock. The Fourdrinier wire moves at a rapid speed and, being in contact with the upper surfaces of the forming table or suction box, undergoes rapid deterioration. The result is that Fourdrinier wires, expensive as they are, need replacement as frequently as every few weeks.

Various and numerous attempts have been made to provide satisfactory surfaces in contact with the Fourdrinier wire, to eliminate the very expensive and costly wearing or distortion of the mesh of the wire. A difficulty has been to obtain a material that is sufficiently rigid and shape-retaining to contact evenly with the wire and that, at the same time, will not break, score, or abrade or cause dragging or tearing of the wire moving thereover.

The present invention comprises a paper machine, of the type described, having improved plates contacting with the lower surface of the upper reach of the Fourdrinier wire, the improved plates combining the desirable properties of being substantially rigid and shape-retaining, adapted to yield slightly and resiliently before being broken or scored, tough, non-warping on being either wetted or dried, of low coefficient of friction with the wire when wet, and showing a minimum tendency to ridge, seize, or drag against the moving wire.

The invention is illustrated in the attached drawing in which

Fig. 1 shows a sheet suitable for use as a cover of a suction box;

Fig. 2 shows a cross sectional view of a suction box with the improved type of sheet forming the cover of the box, the said sheet being shown on section line 2—2 of Fig. 1;

Fig. 3 shows a perspective view of the improved sheet in form adapted for use as a water table or forming board; and

Fig. 4 shows a side, diagrammatic view of certain parts of a Fourdrinier paper machine, illustrating suitable places of use of the articles of the present invention.

It will be understood that the other parts of the paper machine are conventional.

There are shown shaped and hardened articles comprising toughening fibres 1 of the type of asbestos and binder composition 2 that may include rubber or polymerized chloroprene binder compound or the like, and also a lubricant, as, for example, graphite or a small proportion of castor oil, intimately associated with the binder. The binder compound may include also conventional ingredients such as vulcanization or hardening materials and pigments. Thus, there may be used a composition comprising approximately 54 parts by weight of asbestos fibres, 14 parts of pale crepe rubber, 13 parts of comminuted graphite, and a total of 19 parts of such ingredients as zinc oxide, litharge, lime, sulphur, and carbon black.

In making the improved articles, the various ingredients are compounded in convenient manner, as, for example, by mixing mechanically in the presence of a solvent for rubber or other binder. The mixture is then treated to remove the solvents. The remaining material is shaped, die-pressed and vulcanized or hardened. Thus, the final shaping may be made in a die at a pressure at 2,500 pounds pressure to the square inch and at a temperature corresponding approximately to steam at ninety pounds gage pressure to the square inch.

An article so made possesses the desirable combination of properties specified above. In addition, it is adapted to be trimmed, surfaced and

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perforated, sawed, or otherwise provided with apertures, such as the slots 3, for example.

When the apertured sheet is used as a cover for the suction box 4, the sheet is secured as by the countersunk screws 5 to the top of the suction box. As the Fourdrinier wire carrying wet paper stock is moved over this suction box, in frictional engagement therewith, the upper surface of the suction box cover is wet. Of low coefficient of friction when dry, the sheet of material has a very low coefficient of friction with the moving, wet wire. Also, the sheet may yield slightly and resiliently, to minimize breakage or scoring of the sheet or tearing or locking of the Fourdrinier wire.

The article shown in Fig. 3 is adapted for use as a water table or forming board. Such an article is formed as described, and cut to selected dimensions but is not perforated.

Fig. 4 illustrates suitable positions of frictional engagement between the sheets made as described and the Fourdrinier wire. The upper reach of the Fourdrinier wire 6, carrying the wet paper stock (not shown), passes over supporting rollers 7 of conventional type, the forming plates or tables 8 and suction box covers 9.

The Fourdrinier wire and the resilient sheets coact to provide satisfactory contact. They coact to increase the suction at the position of a suction box cover or to minimize rate of drainage of water from the wet stock passing over the water table or forming board.

The details that have been given are for the purpose of illustration, not restriction, and variations may be made within the scope of the appended claims.

What I claim is:

1. A paper machine comprising a moving member of the type of a Fourdrinier wire having wet paper stock thereover and a plate element disposed below a portion of the said member and in frictional contact therewith, the said element including a shaped and hardened composition containing toughening fibres and a binder composition therefor, the said sheet being of low coefficient of friction with the said wire.

2. In a paper machine of the type described, the improvement comprising a moving member of the type of a Fourdrinier wire and a suction box cover contacting with the wire and including a shaped, hardened, and apertured sheet containing fibres of the type of asbestos and a binder composition therefor, the sheet when wet being of low coefficient of friction with the wire.

3. In a paper machine, the improvement comprising a moving member of the type of a Fourdrinier wire and a forming table contacting with the wire and including a shaped, hardened, and imperforate sheet containing fibres of the type of asbestos and a binder composition therefor, the sheet when wet being of low coefficient of friction with the wire.

4. A paper machine comprising a moving member of the type of a Fourdrinier wire supporting wet paper stock and a plate element disposed below a portion of the said member and in frictional contact therewith, the plate element including a lubricant, toughening fibres, and a binder of the type of a rubber compound securing the lubricant and fibres into a substantially rigid but somewhat resilient article.

5. A cover for a suction box of a paper machine including a lubricant, toughening fibres, and a binder of the type of a rubber compound securing the lubricant and fibres into a substantially rigid but somewhat resilient article.

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