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SPRAY RECEIVING DEVICE FOR A PAPERMAKING MACHINE

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FIG. 1

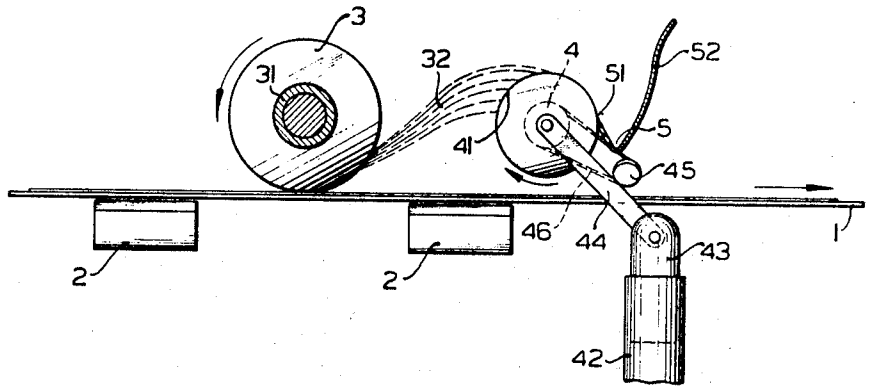
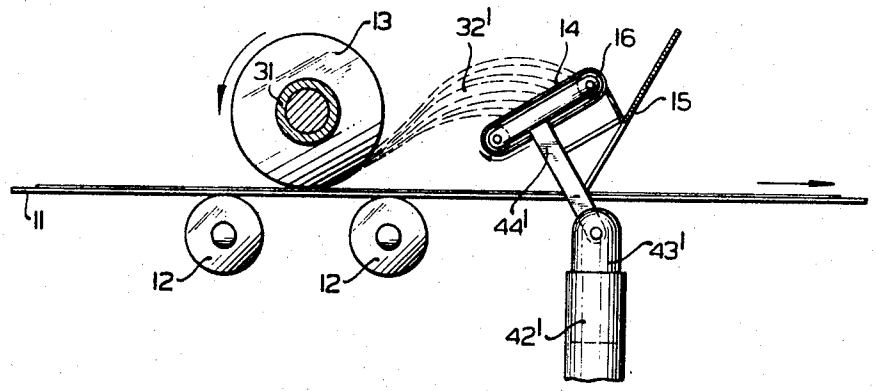


FIG. 2



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SPRAY RECEIVING DEVICE FOR A PAPERMAKING MACHINE

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ABSTRACT OF THE DISCLOSURE

The drops of water and stuff thrown upward and forward from a Fourdrinier wire are intercepted by a face portion of a rotating cylinder or a moving conveyor belt while the intercepting portion moves obliquely upward from the direction of wire movement at least at the speed of the wire, thereby causing the drops to be deposited on the cylinder or belt in a film which is harmlessly removed by a wiper.

This invention relates to papermaking machinery, and particularly to an improvement in Fourdrinier type machines equipped with a dandy-roll.

Dandy-rolls are mounted above the wire at the wet end of Fourdrinier machines to flatten the top surface of the fiber web while it forms on the wire. The roll exerts pressure on the water-bearing fiber material and engages the web with sufficient pressure to squeeze some water from the material. The roll normally revolves at a circumferential speed equal to the wire speed. When this speed is high enough, the water squeezed from the web by the dandy-roll is projected in a spray from the nip of the roll in an obliquely upward direction and falls in drops on the forming paper.

The paper web is extremely sensitive to water in its initial forming stage in which the fibers are not yet firmly interlocked. Water deposited from the spray of the dandy-roll may cause worm marks or even breaks in the web. Dandy-rolls therefore were not commonly employed heretofore on papermaking machines of the Fourdrinier type operating at the very high speeds, such as 900 meters per minute, which are economically advantageous in the making of newsprint. Baffles positioned to receive the spray have not been fully satisfactory because the water drops impinging upon the baffles at high speed tend to rebound and ultimately reach the paper web. It is also difficult to prevent large drops of water from collecting on the underside of the baffle, and from eventually falling on the paper.

The object of the invention is the removal of the water spray generated by a rapidly rotating dandy-roll or other roll which tangentially engages the forming paper web on the wire so as reliably to prevent the water from returning to the web in the form of drops.

With this object in view and others, as will hereinafter become apparent, the invention in one of its aspects resides in the provision of a receiving member for receiving the water of the spray, the receiving member having a continuous or endless face which is being removed in a continuous loop in such a manner that consecutive portions of the face sequentially intersect the spray. The direction of movement of the intersecting face portion must have a component in the direction of wire movement and another component upwardly away from the wire. The water may then be separated from the receiving member at a point remote from the spray.

Other features and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following

detailed description of preferred embodiments when considered with the appended drawing in which:

FIG. 1 shows as much of the wet end of a papermaking machine as is necessary for an understanding of this invention, the view being in side elevation, and partly in section; and

FIG. 2 shows a papermaking machine equipped with a modified spray receiving device of the invention in a view similar to that of FIG. 1.

Referring now to the drawing in detail, and initially to FIG. 1, there is seen the Fourdrinier wire 1 of a papermaking machine which travels at high speed in the direction of the straight arrow over two suction boxes 2. A dandy-roll 3 is mounted between the two suction boxes in bearings 31 and is rotated in a counterclockwise direction, as viewed in FIG. 1, by a non-illustrated conventional drive mechanism which may be of the type shown in "Pulp and Paper Manufacture," J. Newell Stephenson editor-in-chief (McGraw Hill Book Co., Inc., New York, 1953), p. 141, FIG. 91. The circumferential speed of the dandy-roll is kept as close as possible to the translatory speed of the wire 1.

A spray of water 32 contaminated with stock is projected from the nip of the roll 3 upward and forward in the direction of wire movement. The individual drops travel in ballistic curves above the wire and move downwardly after having reached the highest points of their paths.

A cylinder 4 whose axis is perpendicular to the direction of wire movement and which is axially as long as the roll 3 is mounted in such a manner that a portion 41 of its continuous or endless cylindrical face intersects the water spray. The intersecting face portion slopes obliquely upward from the wire 1 and in the direction of wire movement.

The cylinder 4 is supported between two stands of which only one is seen and includes a stationary hollow column 42 receiving another column 43 in vertically telescoping engagement. An arm 44 is hingedly attached to the top of the column 43, and the cylinder 4 is journaled in the free ends of the arms 44. An electric motor 45 drives the cylinder 4 by means of a chain 46 at a circumferential speed that is at least equal to, and preferably greater than the speed of the wire 1. The droplets impinging on the face 41 of the cylinder 4 are entrained by the cylinder so that reflection is minimized. The water and the stock particles suspended therein are carried in a continuous film over the topmost portion of the cylinder 4 which rotates clockwise as viewed in FIG. 1.

A wiper 5 is mounted on the arms 44 in a manner not further illustrated. The wiper is a piece of sheet material bent into an asymmetrical V-shaped trough. The shorter leg of the V is constitued by a narrow wiper blade 51 whose free edge engages the surface of the cylinder 4 to wipe the afore-mentioned film of water into the trough. The longer leg of the V shape is constituted by a baffle 52 whose vertically extending face is directed toward the cylinder 4 and extends upward beyond the top of the cylinder for catching stray drops that may have passed the cylinder face portion 41 or been thrown from the cylinder 4 by centrifugal forces. The trough 5 slopes transversely of the direction of wire movement in a manner not illustrated for discharging the collected water and stock at a point laterally beyond the wire 1.

The elements which hold the columns 42, 43 and the arm 44 in the illustrated position have not been explicitly shown, but it will be understood that the column 43 may be raised or lowered from the position shown, and may be secured in any desired position relative to the column 42 by stop pins passing through alignable openings in the columns. The arm 44 may be swung about its pivot on the column 43, and may be secured in any desired angular

position in an analogous manner, not illustrated. The resulting movement of the cylinder **4** relative to the roll **3** permits the spray receiving device to be adjusted for variations in stock composition or wire speed which affect the path of the spray.

The portion of a papermaking machine illustrated in FIG. 2 includes a Fourdrinier wire **11** traveling over two table rolls **12** and cooperating with a dandy-roll **13** mounted in bearings **31** and projecting a spray **32'** of stock-contaminated water. The spray is received on a belt **14** trained over two pulleys **16** in a continuous loop. The spray receiving face of the belt **14** slopes obliquely upward from the direction of wire movement.

The belt **14** is driven at a speed equal at least to the wire speed by one of the pulleys **16** which is motor-driven in a conventional manner, not illustrated. The two pulleys and the associated, non-illustrated motor are mounted on an arm **44'** attached to an expandable column having two telescopically engaged parts **43'**, **42'**. The arm **44'** and the column shown in the drawing constitute one of two identical stands for the pulleys **16**, the other stand not being visible.

The arms **44'** also support a trough-shaped wiper **15** closely similar to the afore-described wiper **5**. Its free edge engages the belt **14** as it travels about the upper pulley **16**.

It is a common feature of both illustrated embodiments of the invention that the spray of water thrown by the dandy-roll is intercepted by a moving surface which is obliquely transverse to the paths of the water particles and moves in a direction which is obliquely upwardly inclined relative to the direction of wire movement. The optimum speed of the receiving face is best determined experimentally, but it should normally not be smaller than the speed of the machine wire in order to entrain all spray water. The collected water then forms a film which is wiped from the receiving face. A build-up of stock stalactites of the type sometimes observed with stationary baffles is impossible with the device of this invention.

The origin of the water spray is not in itself at the core of this invention, and it will be appreciated that the invention can protect the forming paper web from defects caused by water droplets which are thrown from any rapidly rotating roll tangentially engaging the web as it travels on the wire.

What is claimed is:

1. In a papermaking machine including a Fourdrinier wire arranged for substantially horizontal movement and for carrying a water-bearing web of fibers thereon, and a roll engaging said web while rotating at a circumferential speed equal to the speed of wire movement, whereby a spray of water is thrown by said roll upwardly and forwardly in the direction of wire movement, the spray thereafter moving downwardly, the improvement which resides in receiving means for receiving the downwardly moving water, the receiving means comprising:

(a) a receiving member forwardly spaced from said roll and having a face extending in a closed loop;

(b) actuating means connected to said receiving member for continuously moving said face obliquely upward from said wire and in the direction of movement of the latter, said face intersecting the downwardly moving part of said spray, whereby the water of said spray is collected on the moving receiving member; and

(c) removing means for continuously removing the collected water from said receiving member during the movement of said face.

2. In a machine as set forth in claim **1**, said removing means including a wiper member engaging said face.

3. In a machine as set forth in claim **2**, said actuating means including means for rotating said receiving member about an axis, transverse of the direction of wire movement, said receiving member being of circular cross section about said axis.

4. In a machine as set forth in claim **2**, said receiving member being an endless belt.

5. In a machine as set forth in claim **2**, said wiper member including a baffle portion and a blade portion, said baffle portion being spaced from said receiving member in a direction away from said roll and having a vertically extending face directed toward said receiving member, said blade portion being joined to said baffle portion to constitute therewith a trough and having an edge engaging said face.

6. In a machine as set forth in claim **1**, adjusting means for varying the position of said receiving member relative to said roll.

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U.S. Cl. X.R.

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