E. F. MILLARD.

PULP FEEDING DEVICE FOR PAPER MACHINES.

APPLICATION FILED APR. 15, 1907.

933,656. Patented Sept. 7, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

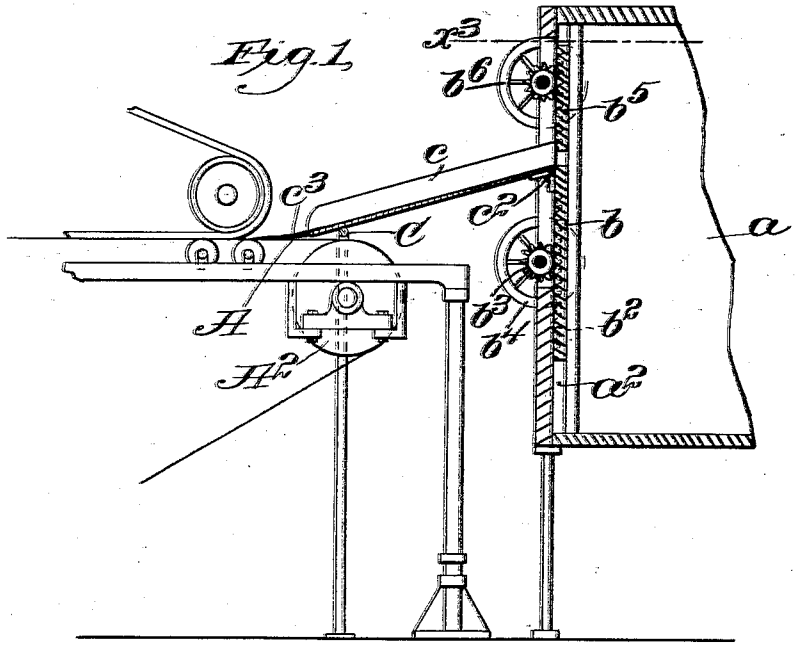



Fig. 2.

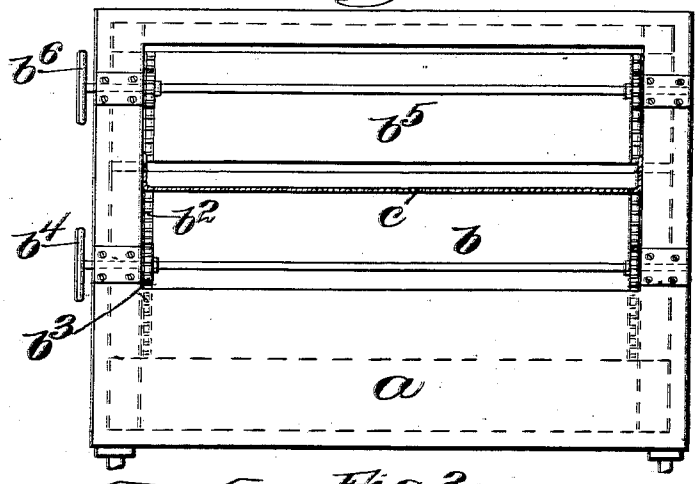
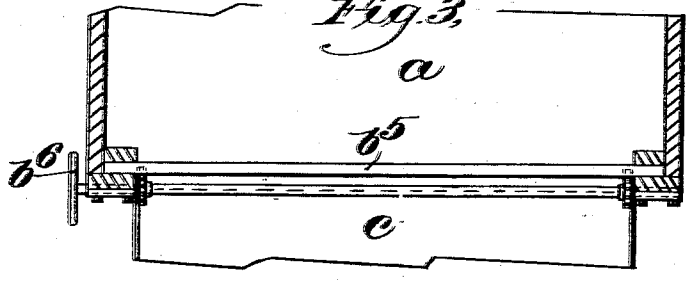



Fig. 3.

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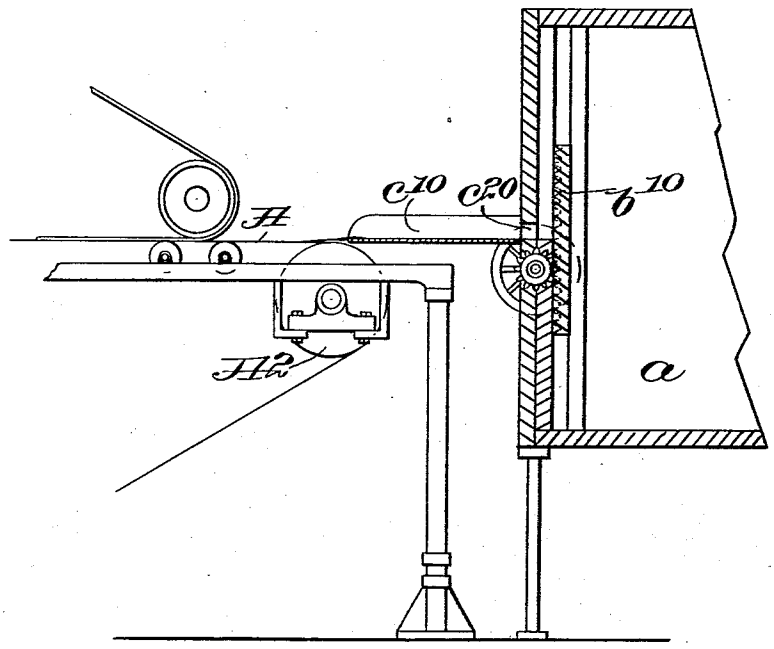
2 SHEETS—SHEET 2.

Fig. 4.

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# UNITED STATES PATENT OFFICE.

EDWARD F. MILLARD, OF WATERTOWN, MASSACHUSETTS.

## PULP-FEEDING DEVICE FOR PAPER-MACHINES.

933,656. Specification of Letters Patent. Patented Sept. 7, 1909.

Application filed April 15, 1907. Serial No. 368,201.

*To all whom it may concern:*

Be it known that I, EDWARD F. MILLARD, a citizen of the United States, residing in Watertown, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Pulp-Feeding Devices for Paper-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a Fourdrinier paper machine, and is embodied in novel means for feeding the liquid pulp to the wire part of the machine, the purpose of the invention being to give the pulp a certain velocity as nearly as possible equal to the velocity of movement of the wire, so that the pulp and the wire are in effect stationary relative to each other, although they travel together. This results in the draining of the pulp without any dragging movement of the wire against the pulp to disturb the fibers, the result being the formation of a better matte, without departing from the continuous process provided for by the use of the machine.

In carrying out the invention, the machine is provided with means for causing the pulp to flow or travel from the supply tank to the wire, and may also be provided, as a secondary feature, with means for regulating the velocity of flow of the pulp and causing it to approximately equal the velocity of movement of the wire. The velocity of feed movement may be accomplished by providing the feed tank, in which the pulp is kept stirred up, with an inclined runway which extends from the tank to a point over the wire where it leaves the breast roll of the machine, or with means for causing the pulp to flow under a head or pressure. For purposes of adjustment, the runway may be arranged so as to vary the inclination thereof, or a vertically adjustable dam may be employed to vary the head; or the head or pressure may be varied by any suitable expedient.

Figure 1 is a side elevation, partly in section, of the breast roll end of a Fourdrinier paper machine provided with feeding mechanism constructed in accordance with the invention; Fig. 2 is a front elevation of the feed mechanism, the trough or runway being shown in section; Fig. 3 is a horizontal section on the line $x^3$ of Fig. 1; and Fig 4 is a view similar to Fig. 1, showing a modification.

In operating a Fourdrinier machine, the liquid pulp is flowed on to the surface of the traveling wire A at a point adjacent to the breast roll $A^2$ over which the wire travels, it being customary to cause the pulp to empty from a tank, the surface level and overflow point of which are substantially on a level with the wire A. The pulp in this case is substantially stationary, that is to say, has no initial velocity, when it is delivered to the wire, and is dragged along by the wire in the draining and drying process.

In order to give the pulp an initial velocity of flow, so that it tends to travel with the wire, instead of being dragged along thereby, the machine is provided, in accordance with this invention, with means for giving the pulp such initial velocity, for example, by providing the apparatus with a gravity feed such as an inclined trough down which the pulp flows to the wire.

In the construction shown in Figs. 1 to 3, the tank *a*, which is kept supplied with a quantity of pulp, is provided with a vertically movable dam *b* provided at the top with a runway or trough *c* extending from the top of the dam or the overflow down to the surface of the wire A. The pulp overflowing from the tank, therefore, and running down the trough, will acquire a certain velocity which may be regulated by varying the inclination of the trough, until it substantially equals the velocity of movement of the wire A. In the construction shown, the trough *c* is hinged at $c^2$ to the top of the dam *b*, and is provided at its lower end with a flexible apron $c^3$ which lies in contact with the wire A so as to permit the pulp to distribute itself evenly over the wire.

To vary the inclination of the trough *c*, the dam *b* is vertically movable, being shown as provided with a rack $b^2$ in mesh with the pinion $b^3$ arranged to be operated by a hand wheel $b^4$. The dam may be fitted into the wall of the tank in any suitable way, the tank being herein shown as formed with recesses $a^2$ at opposite sides in which the opposite ends of the dam *b* fit with sufficient accuracy to prevent leakage. It is sometimes desirable to draw off the pulp from a level below the surface thereof, so as to prevent any foamy substance floating on top from reaching the wire, and a supplemental ad-

justable cut-off $b^5$ operated for adjustment by a hand-wheel $b^6$, is herein shown for the purpose of regulating the size of the opening. The trough $c$ is shown as supported at its lower end upon a stationary cross-member C, so that the trough will not be shaken by the vibratory movement of the shake-rails. The desired end may be obtained without the intervention of the inclined trough by otherwise providing for flow of pulp under pressure or head. As shown, for example, in Fig. 4, the liquid may be maintained in the tank at a level above the level of the wire, by means of the dam $b^{10}$, which projects above the opening $c^{20}$ to the horizontal trough $c^{10}$, so that the liquid pulp is delivered under a head determined by the height of the top of the dam $b^{10}$, which may, as indicated, be adjustable. It is obvious, moreover, that by regulating the size of the opening, shown in Fig. 1, between the dams $b$ and $b^5$, the outlet capacity of the tank may be restricted with relation to the inlet capacity, so that any desired head may be retained without using the inclined trough.

Claims.

1. The combination with the wire part of a Fourdrinier paper machine; of a feed tank; a substantially flat delivery trough leading from said tank to said wire part, and substantially the same in width as said wire part, to deliver a thin layer of material to the traveling surface of said wire part; and a vertically adjustable delivery outlet from the tank above the level of the wire part, whereby the thin layer of material is delivered in the desired quantity with a velocity of flow to correspond substantially with the velocity of movement of the wire part.

2. In the art of making paper, the process herein described of fixing the formation of the sheet at the breastroll end of the paper making wire, which consists in delivering the stock to the wire at a speed corresponding to the speed of the wire, so that the stock moves with the wire at the start by momentum, permitting the fibers to settle on the wire.

3. In the art of making paper, the process herein described of fixing the formation of the sheet at the breastroll end of the paper making wire, which consists in delivering the stock to the wire at a speed corresponding to the speed of the wire, so that the stock moves with the wire at the start by momentum, permitting the fibers to settle on the wire, and thereafter, as the formation of the sheet gradually becomes fixed on the wire, gradually imparting motion to the stock by the wire, without interrupting formation of the sheet.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD F. MILLARD.

Witnesses:
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