(No Model.)

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STUFF REGULATOR FOR PAPER MACHINES.

No. 565,665. Patented Aug. 11, 1896.

Fig. 1.

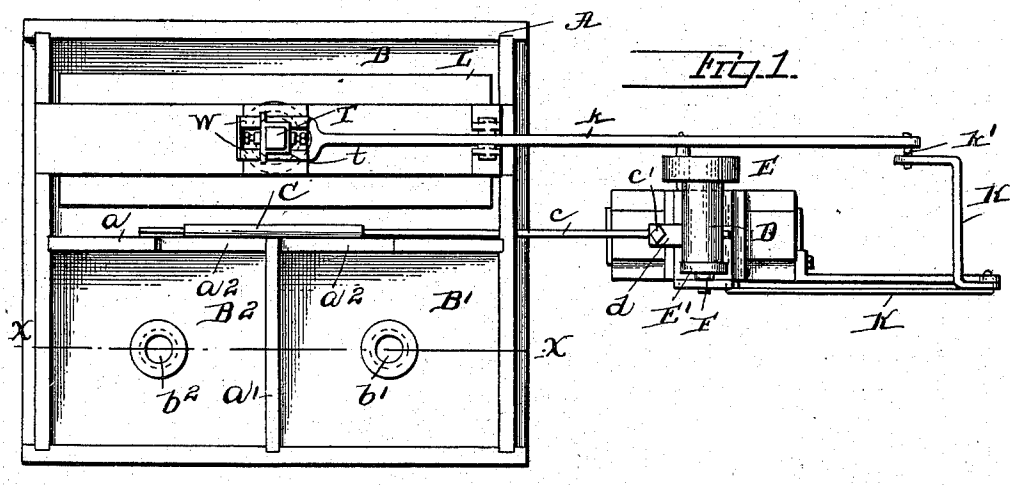

Fig. 2.

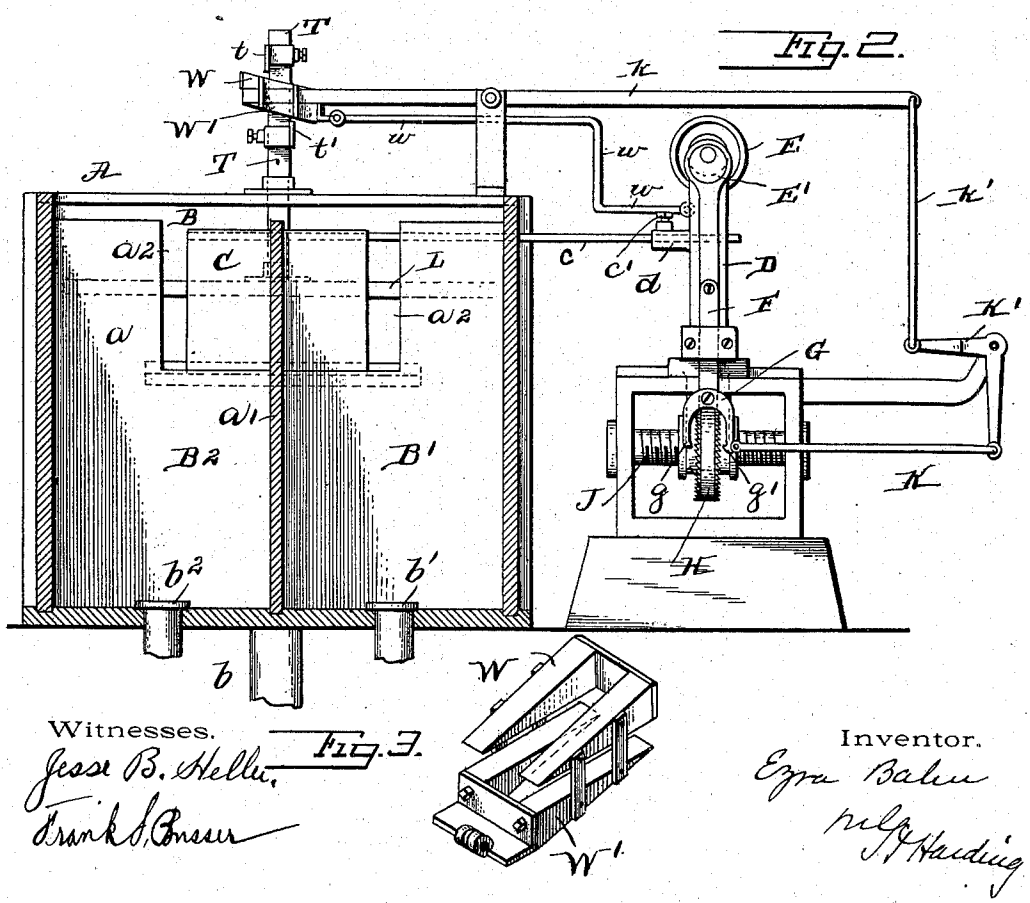

Fig. 3.

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STUFF-REGULATOR FOR PAPER-MACHINES.

SPECIFICATION forming part of Letters Patent No. 565,665, dated August 11, 1896.

Application filed February 6, 1896. Serial No. 578,176. (No model.)

To all whom it may concern:

Be it known that I, EZRA BAHN, a citizen of the United States, residing at Spring Grove, county of York, and State of Pennsylvania, have invented a new and useful Improvement in Stuff-Regulators for Paper-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object to provide an even delivery of pulp from the pump-box to the paper-machine. In making paper the pulp goes from the beaters in a more or less saturated condition to the chest, from which it is pumped to the pump-box and from which latter the pulp passes to the paper-machine. In practice the density of the pulp, that is, the quantity of the pulp in the admixture coming to the chest, is not even. The action of the pump being constant, if the discharge from the box to the machine be held constant the quantity of pulp in the admixture passing to the machine will vary, and, as the thickness and weight of the paper depends upon the quantity of pulp delivered to the machine, the weight of the paper will vary accordingly.

My invention has for its object the automatic regulation of the discharge from the box, dependent on the density of the pulp, as will hereinafter be described, so that the quantity of pulp passing to the machine will be constant.

I will now describe the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view. Fig. 2 is a section on the line $x\,x$, Fig. 1. Fig. 3 is a perspective of the wedges.

A is the pump-box, which is divided into three compartments by means of a longitudinal partition a, which is lower than the main surrounding walls of the box, and a lateral partition a', which extends from the partition a to one of the main side walls. The box A is thus divided into three compartments B B′ B², compartment B extending the entire length and one-half the width of the box. Compartments B′ and B² each are half the length and one-half the width of the box. In compartment B is an inlet b from the pump, (not shown,) in compartment B′ is an outlet b' to the paper-machine, and in compartment B² is an outlet b^2, leading back to the stuff-chest.

The central partition a has a cut-away portion a^2, partially closing which is a gate C, sliding on proper guides or ways. The length of this gate C is such that it leaves a space between each of its ends and the corresponding end of the cut-away portion to carry off a quantity of material equal to the amount pumped into the box. When this gate is centrally disposed, the width of the space on one side of the gate is equal to the width of the space on the other side and an equal amount of material will pass to sections or compartments B′ and B², and, by moving this gate in either direction, the relative amount passing to each compartment will be varied. Now, while the pump capacity is fixed at all times, the proportion of water and pulp in the admixture, as before stated, varies, and the object of my invention, generally speaking, is to automatically vary the size of the openings on each side of the gate, so that, as the admixture varies in density, a greater or less quantity of it will pass to the compartment B′ and thence to the paper-machine. In other words, if the density of the material, that is, the proportion of pulp in the admixture in compartment B, becomes greater, the object is to diminish the supply of material going to the machine, so that the quantity of pulp passing thereto will remain constant, and if the density of the material decreases to increase the supply going to the machine.

My invention consists particularly in a float acted upon by the pulp in the compartment B and intermediate mechanism between the float and the gate, whereby the rising and falling of the float will transmit a to-and-fro sliding movement of the gate, and in a loose connection between the float and the intermediate mechanism, whereby immaterial variations in the position of the float will not affect the intermediate mechanism and thereby avoid constant and injurious wearing thereof.

The float (lettered L in the drawings) rests upon the pulp in the admixture in compartment B, and as the pulp has a slightly greater density than water the quantity of pulp in the admixture will affect the position of the

float, that is, when the pulp is dense the float will have a higher position than when the pulp is less dense.

To the gate C is attached the rod *c*, the other end of which is connected by means of the thumb-screw *c'* with the plate *d*, resting on the frame D.

E is a pulley-wheel driven by a belt from a desired point. On the shaft of the pulley is an eccentric E'. F is a link connecting this eccentric with the pivoted double pawl G, having pawl ends *g* and *g'*. This link passes through the plate *d*.

H is a ratchet-wheel having on opposite sides opposite-faced ratchet-teeth, and the pawl ends *g g'*, coacting with their teeth, drive the ratchet-wheel in opposite directions. The shaft of the ratchet-wheel is internally threaded and works on the threaded shaft J and has its bearing in an extension of the frame D, which extends down to and around the threaded shaft J.

As the device just described forms no part of my invention it is not illustrated more in detail. It is only necessary to bear in mind that the frame D and pulley E are fixedly connected with the ratchet-wheel H and move back and forth with it.

According as to which pawl *g* or *g'* is operated, the ratchet travels in one direction or the other on the threaded shaft, and in so moving, through the medium of plate *d* and rod *c*, moves the gate C in one direction or the other, increasing the inlet into compartment B' and decreasing into B^2 in one direction, and vice versa in the other direction, and thus varying the amount of material passing to the paper-machine. I determine the movement of the pawls in and out of engagement with the ratchets in the following manner: To the pawl is attached one end of a wire or rod K, the other end being connected to a bell-crank K'. A link *k'* connects the bell-crank K' and one end of a lever *k*, fulcrumed between its ends. The free end of the lever is slotted, and through the slot extends a rod T, which passes through an orifice in a beam connected to the box A, and is connected to the float L within compartment B.

To the rod T is secured, by thumb-screws or otherwise, two trips *t* and *t'*, one above and the other below the lever *k*, the latter being in line of movement of these trips when this float-rod rises and falls. The object of this loose connection between the float-rod and the lever *k* is to prevent constant wearing of the teeth of the ratchet mechanism before described, due to immaterial variations in the height of the float.

The machine is so set that when the paper-machine starts with the box full of the admixture the gate is in such position that an amount of the admixture sufficient to give the desired amount of pulp passes to compartment B'. If for any cause the admixture in the box should thereafter, during the running of the paper-machine, become thinner, the pulp will fall, and with it the float. The fall of the float will cause trip *t* to engage and push down the free end of lever *k*, which, through the connection hereinbefore described, will draw the rod K to the left, tilt the double pawl, and throw the pawl *g'* into engagement with its corresponding ratchet. As the pulley E is in constant rotation, and as a constant reciprocation is imparted to the pawls by the eccentric E' and link F, the ratchet-wheel H will be turned on the threaded shaft. As the ratchet-wheel revolves it will travel to the left upon the threaded shaft, carrying with it the frame D, which, through the connection before described, moves the gate C to the left to make larger the inlet to the compartment B' and smaller the inlet to compartment B^2, and thus more of this thinner admixture passes to the machine, and the amount of pulp fed to the machine is held constant. As the ratchet-wheel revolves it will gradually move to the left away from the pawl *g'* until it is entirely out of engagement therewith, when the movement of the gate to the left will cease. The double pawl, which is pivoted to the frame D, gradually resumes a vertical position as the frame D moves to the left, so as to be in operative position to be affected by the next rise or fall of the float. The reverse takes place when the admixture becomes richer in pulp and poorer in water, the float rising and the trip *t'* acting to raise lever *k*, which, through the mechanism described, acts upon the pawl *g*, and through it the ratchet and gate, so as to move them to the right and make smaller the inlet to compartment B' and larger the inlet to compartment B^2, and thus less of the admixture passes to the paper-machine, but the quantity of pulp fed is held constant.

It is necessary to keep the lever *k* midway between the trips *t t'*; otherwise, after the float rises from its illustrated position, the trip *t'* will be in contact with lever *k*, and when it falls it will have to move twice the former distance before the trip *t* engages with lever *k*.

To keep the lever *k* midway between the trips *t* and *t'*, I adopt the following construction: Wedges W W' are placed one above and the other below the lever and in contact therewith, are adapted to have a sliding movement thereupon, and are in line of movement of the trips. To the frame D is rigidly or pivotally secured the bent bar *w*, which is connected at its other end to the wedges. The operation of this device is as follows: Should the float rise and the trip *t'* strike the wedge W' to move up the lever *k*, the gate and rod *c* will move to the right, whereby, through bar *w w'*, pulling the wedges to the right and the wedge W' out of contact with the trip *t'* until the striking-surfaces of the wedges are equidistant from their corresponding trips. The gate has now been moved to partially close the opening to the box leading to the machine, and should the pulp become less dense,

causing the float to fall, the float need only fall the determinate distance before the upper trip will strike the upper wedge and move the lever to its central position. Should the float, instead of rising, fall, the wedges move to the left and the wedge W is brought out of engagement with trip *t*, the operation being exactly the reverse of that caused by the rising of the float.

It will be seen that I accomplish the operation of the gate by a determinate rise or fall of the float by means of two devices between the trips on the float-rod, one of which (the lever *k* and its connections) is operated by the float to actuate the gate-moving mechanism, and the other of which (the wedges) is operated by the gate-moving mechanism.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In a stuff-regulator for paper-machines, the combination with the tank for receiving the pulp and water from the stuff-chest and having a discharge-outlet to the paper-machine, of a gate for regulating the size of said outlet, a float in said tank, intermediate mechanism between the float and the gate for actuating the gate, and a loose connection between the float and the intermediate actuating mechanism, whereby the said mechanism is operated only by a determinate rise or fall of the float.

2. In a stuff-regulator for paper-machines, the combination with the tank for receiving the pulp and water from the stuff-chest and having a discharge-outlet to the paper-machine, of a gate for regulating the size of said outlet, a float in said tank, a rod attached to said float, trips carried by said rod, a device between said trips and in line of movement thereof, and intermediate mechanism between and connected with said device and the gate for actuating the gate.

3. In a stuff-regulator for paper-machines, the combination with the tank for receiving the pulp and water from the stuff-chest and having a discharge-outlet to the paper-machine, of a gate for regulating the size of said outlet, a float in said tank, a rod attached to said float, trips carried by said rod, a lever between said trips, intermediate mechanism between and connected with said lever and the gate for actuating the gate, wedges above and below and in engagement with said lever in line of movement of said trips, and a connection between said wedges and the actuating mechanism.

4. In a stuff-regulator for paper-machines, the combination with the tank for receiving the pulp and water from the stuff-chest and having a discharge-outlet to the paper-machine, of a gate for regulating the size of said outlet, a float in said tank, a rod attached to said float, trips carried by said rod, two devices between said trips and adapted to be operated thereby, intermediate independently-operative mechanism normally inoperative connected with and adapted when operative to move the gate, and connected also with said devices, one of said devices when operated being adapted to throw into action the intermediate mechanism, and the other of said devices being adapted to be moved by the operation of the intermediate mechanism, substantially as described.

In testimony of which invention I have hereunto set my hand.

EZRA BAHN.

Witnesses:
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W. H. RICE.