(No Model.) 2 Sheets—Sheet 1.

T. P. BARRY.

PAPER MACHINE.

No. 285,954. Patented Oct. 2, 1883.

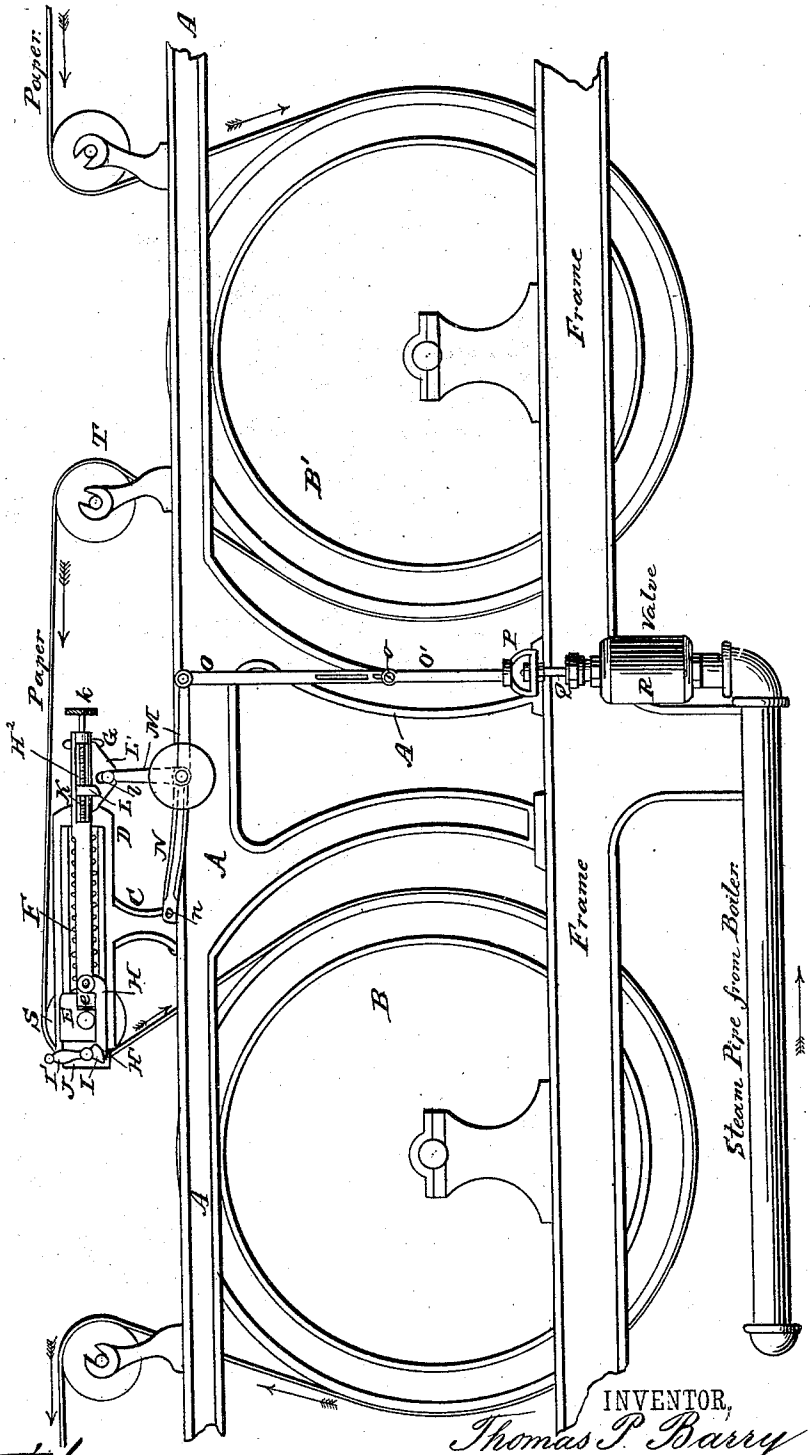


Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig 2.

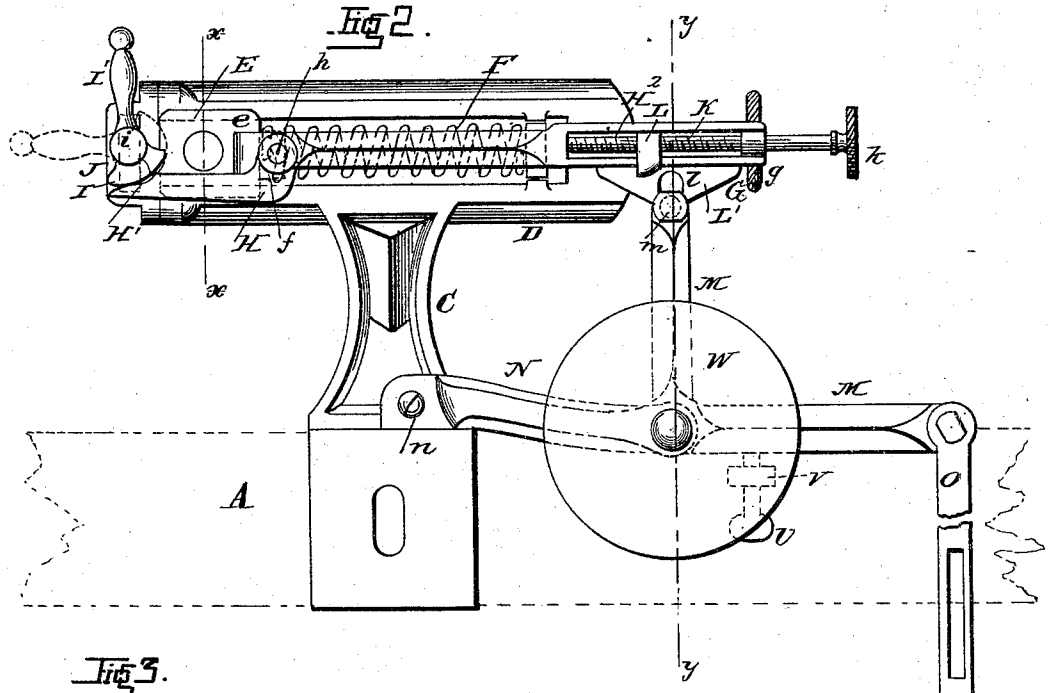


Fig 3.

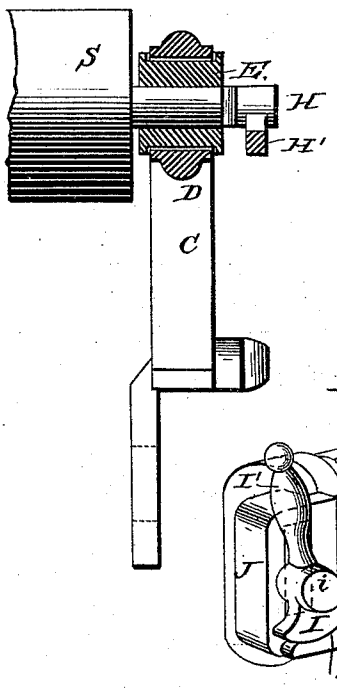
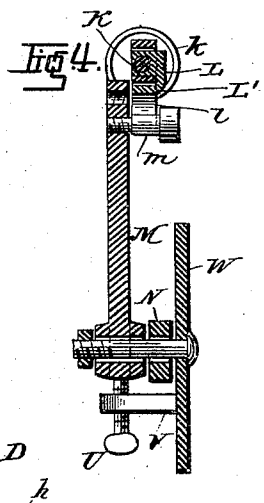


Fig 4.



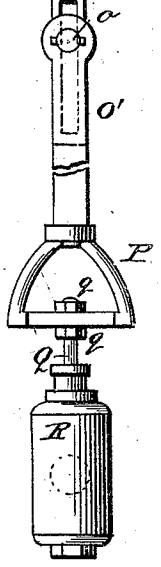
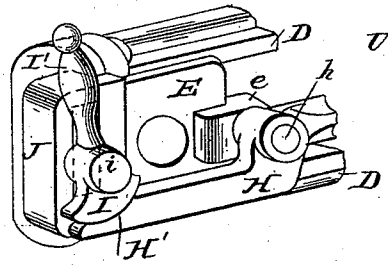


Fig 5.



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UNITED STATES PATENT OFFICE.

THOMAS P. BARRY, OF STILLWATER, NEW YORK.

PAPER-MACHINE.

SPECIFICATION forming part of Letters Patent No. 285,954, dated October 2, 1883.

Application filed March 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS P. BARRY, of Stillwater, in the county of Saratoga and State of New York, have invented certain new and useful Improvements in Paper-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation of so much of a paper-machine as is necessary to illustrate the application of my invention. Fig. 2 is a side view of my automatic steam-regulator and its appurtenances. Fig. 3 is a cross-section through line *x x* in Fig. 2. Fig. 4 is a cross-section through line *y y*, Fig. 2; and Fig. 5 is a perspective detail view of the front end of the device.

Similar letters of reference indicate corresponding parts in all the figures.

My invention has relation to devices or appliances for regulating automatically the flow of steam to the "driers" or drying-cylinders of paper-machines; and it consists in the construction and combination of parts of the device or apparatus, as hereinafter more fully described and claimed, whereby I am enabled not only to automatically control the pressure of steam from the boiler, but by the contraction and expansion of the paper itself to insure perfect uniformity in dryness, regardless of thickness of the paper or change in speed of the machine; while, if the paper should break, the steam will be shut off automatically from the driers until taken over again. My apparatus is applicable to all classes of machines for manufacturing paper or straw-board in which the drying is effected by drying-cylinders heated by steam or hot air.

In the accompanying two sheets of drawings, A denotes the frame of the machine, and B B′ two of the driers.

C is a stand, which is bolted to the frame and has a slotted cross-head, D, in which slides a flanged block, E, having a projection, *e*, on one side. A coiled spring, F, is inserted into the back part of cross-head D, bearing with its free end against the sliding block E, the inner end of which has a stud, *f*, fitting into the adjacent coils of the spring. The tension of spring F may be adjusted by means of a screw, G, working through the back part of cross-head D, and having a milled head, *g*, for operating it.

H is an arm, which is pivoted upon a bolt, *h*, fixed in the lip or projection *e* of block E and moves with it. The forward end of this arm is depressed and beveled, as shown at H′, to fit a segmental block, I, which is pivoted in a slotted box, J, in the front end of cross-head D, and has a handle, I′, for turning it. The rear end of arm H is slotted longitudinally, as shown at H^2, and into this slotted end is inserted a screw, K, having a milled head, *k*, for operating it.

L is a box sliding in the slotted end of arm H, within which its position may be adjusted by means of the screw K, which passes through it. This box L has a downward projection, L′, notched or recessed at *l* to adapt it to engage a pin or stud, *m*, on a bell-crank, M, which has its fulcrum at the outer end of an arm, N, fixed in the stand C by means of a set-screw, *n*. In the outer end of the horizontal arm of the bell-crank is hinged adjustably a rod, O, having an extension, O′, which may be adjusted by means of a jam-screw, *o*, so as to regulate the length of arm O O′. At the lower end of the part O′ is a slotted stirrup, P, which is coupled, by means of nuts, (shown at *q q*,) to the upper end of the valve-stem Q, by means of which valve R, through which steam is admitted from the boiler to the driers, is operated. In other words, the quantity of steam admitted to the driers through the valve will depend upon the position of arm O O′, which is actuated by the bell-crank M and arm H, which, as we have seen, is in turn effected by the expansion and contraction of the paper.

The sliding block E forms one of the journal-boxes or bearings for a roller, S, the other end of which is journaled in another sliding bearing similar to E, and, like this, mounted in a cross-head on the opposite side of the machine, which has an adjustable spring arranged in precisely the same manner and for the same purpose as spring F, (shown in the drawings, in which I have represented only one of the roller-bearings with its spring.) The actuating-springs in both roller-bearings should be

adjusted precisely to the same tension, so that roller S will stand true, parallel to the axis of the driers. The paper, as it comes from the drier B′, passes over a roll, T, and over the spring-actuated roll S′, journaled in the sliding box E, the spring F of which operates to give the paper its proper tension between the two rolls S and T, from the former of which the paper passes down around drier B, and so on through the rest of the series of driers.

Having in the foregoing described the detailed construction of my apparatus, I shall now proceed to describe its operation.

The spring F having been adjusted to the proper tension, according to the weight of the paper being made, it will be seen that any contraction of the paper between the rolls S and T operates to contract the spring F and draw the sliding box E back in its cross-head D, carrying with it the pivoted arm H. As the rear end of this arm engages the upper arm of bell-crank M, it follows that this is tilted on its fulcrum, thus lowering the valve-rod O O′, and by actuating the valve-stem Q partially shutting off steam from the driers, thus gradually decreasing their heat. As the paper gradually expands, the position of roller S is, through the springs actuating its bearings E, restored to its normal position, which actuates the valve-rod O O′, and thereby controls the flow of steam to the driers. On the other hand, if the paper is too wet, causing the web to expand between rollers T and S, the tension of spring F operates to push box E out, and thus actuate arm H, bell-crank M, and valve-rod O O′ in such a manner as to open the valve and increase the flow of steam through it into the driers. As the paper is gradually brought to its proper degree of dryness the valve is restored to its normal condition. Should the paper break, spring F will push the block or bearing E out against the slotted box J in the front end of cross-head D, thereby causing the beveled projection H′ of arm H to engage the segmental block or cam I, which tilts the slotted rear end, H^2, of the arm in an upward direction, so as to release its notched block L L′ from the stud *m* of the bell-crank with which it engages, which causes rod O O′ to drop, closing the valve and shutting off steam from the driers. Inasmuch as it would be inexpedient to shut the steam off altogether, as that would cause the driers to cool too rapidly, causing waste of paper as well as loss of time, inasmuch as some time would be occupied in restoring to the driers the proper degree of heat, I prevent the lower arm of the bell-crank from dropping down too far by means of a set-screw, U, inserted through a projection, V, on the inner side of a disk, W, which is fastened at the outer end of arm N.

By making the box or bearing *i* of the segmental block or cam I vertically adjustable in the slotted box J in the front end of the cross-head D, the cam may be adjusted up or down, so as to regulate the throw of the rear end of arm H as its front end engages the convex swell of the cam; and by tilting this out of the way, as indicated by the dotted lines, the rear end of arm H will drop and thereby tilt the bell-crank, so as to throw the valve completely open and feed steam to the driers prior to taking the paper over again.

By means of the screw K and sliding block L L′, the position of the latter upon arm H may be so adjusted, forward or back, as to regulate the position of bell-crank M and valve-rod O O′, by which, in turn, the valve-stem is adjusted, so as to feed a given amount of steam under a given pressure to the driers. As the steam-pressure in the boiler from which the steam is taken is apt to vary, it follows that the amount of steam fed to the driers varies correspondingly; but by adjusting block L L′, by means of its screw, it will be seen that the valve can be so regulated in a moment of time as to compensate for the varying pressure in the boiler. To equalize, as far as may be, the steam-pressure, I prefer to use, in this connection, a valve of an improved construction, which forms the subject of a separate application for Letters Patent. In practice it will, however, not be necessary to adjust screw K unless the steam-pressure should vary, say, from fifteen to twenty-five pounds, as the apparatus, for anything less than that, will adjust itself automatically so as to equalize the steam-pressure.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of the stand C, having slotted cross-head D, sliding block E, tension-spring F, and screw G, substantially as and for the purpose shown and set forth.

2. The combination of the spring-actuated block E, lever H, having beveled front end, H′, and slotted rear end, H^2, sliding block L L′, and means for adjusting the same, bell-crank M, engaging block L L′, valve-rod O O′, and valve R, substantially as and for the purpose shown and set forth.

3. The combination of the spring-actuated block E, lever H, cam I I′, block L L′, and means for adjusting the same, bell-crank M, valve-rod O O′, and valve R, substantially as and for the purpose shown and set forth.

4. The combination, with the driers of a paper-machine, of the roll T, journaled in fixed bearings, roll S, journaled in sliding box or block E, cross-head D, spring F, and means for adjusting the tension of the same, cam I I′, lever H, adjustable slide L L′, bell-crank M, valve-rod O O′, and valve R, substantially as and for the purpose shown and set forth.

5. The device or apparatus for regulating automatically the flow of steam to the driers of a paper-machine, herein shown and described, the same consisting of the stand C, having cross-head D, sliding block E, spring F, and means for regulating the tension of the same, pivoted cam I I′, lever H, constructed and ar-

ranged as described, sliding box or block L L′, and means for adjusting the same, bell-crank M, valve-rod O O′, and valve R, all constructed and combined to operate substantially in the manner and for the purpose shown and set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

THOMAS P. BARRY.

Witnesses:
LOUIS BAGGER,
ARTHUR L. MORSELL.