

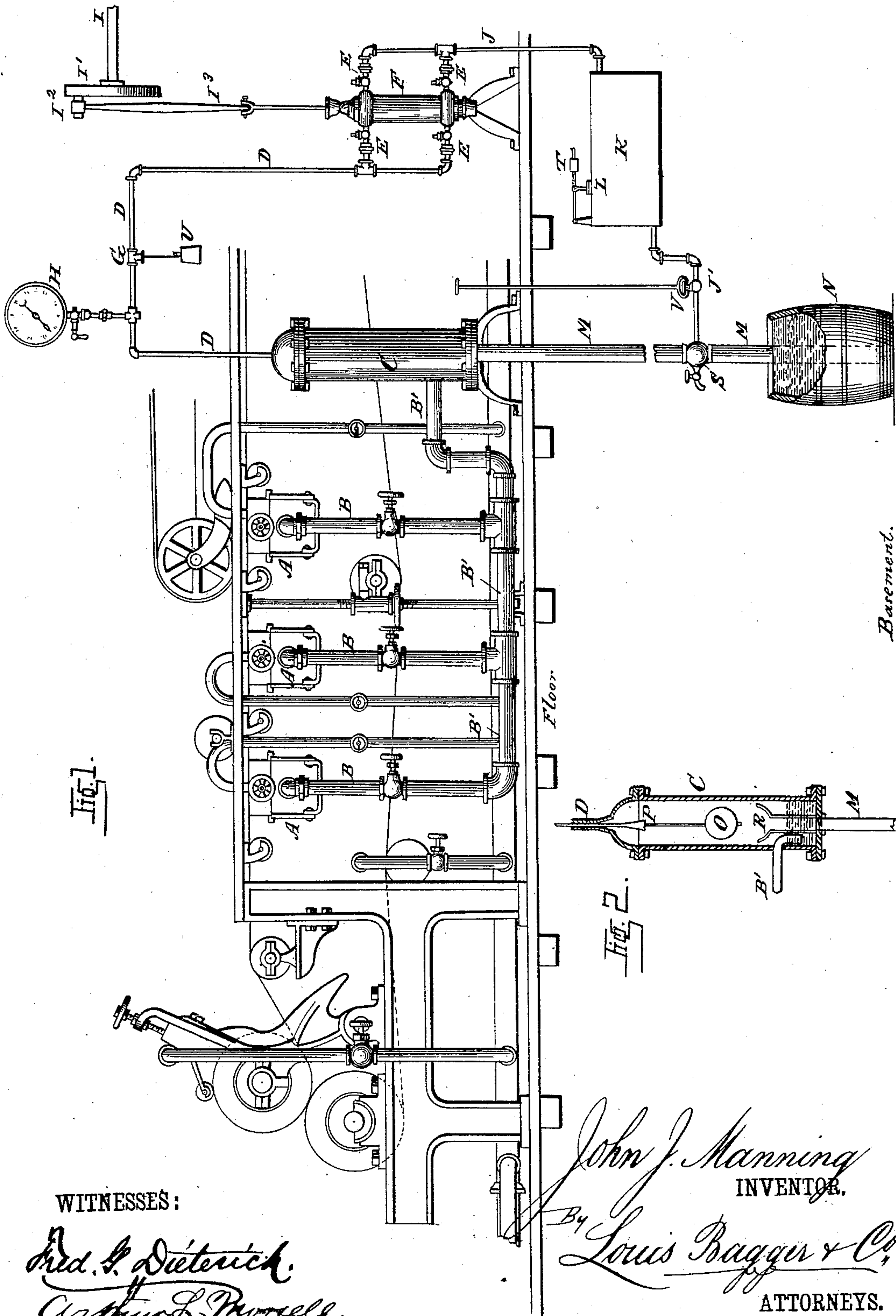
(No Model.)

J. J. MANNING.

METHOD OF AND APPARATUS FOR EXHAUSTING THE AIR AND EXTRACTING
THE WATER FROM THE SUCTION BOXES OF PAPER MACHINES.

No. 282,096.

Patented July 31, 1883.



WITNESSES:

Fred. S. Dieterich.
Arthur L. Howell.

John J. Manning
INVENTOR.
By *Louis Ragger & Co.*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN J. MANNING, OF GREAT BARRINGTON, MASSACHUSETTS.

METHOD OF AND APPARATUS FOR EXHAUSTING THE AIR AND EXTRACTING THE WATER FROM THE SUCTION-BOXES OF PAPER-MACHINES.

SPECIFICATION forming part of Letters Patent No. 282,096, dated July 31, 1883.

Application filed June 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. MANNING, a citizen of the United States, and a resident of Great Barrington, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in a Method of and Apparatus for Exhausting the Air and Extracting the Water from the Suction-Boxes of 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 of the "Fourdrinier" pattern as is necessary to illustrate the application of my invention with my apparatus in operative position; and Fig. 2 is a vertical sectional view of the receiving-chamber detached from the rest of the apparatus.

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

In the manufacture of paper on machines of the so-called "Fourdrinier" type or pattern, as well as on so-called "cylinder" machines, the preliminary process consists in extracting the water from the paper-pulp while it is traveling with the web of wire-cloth or felt over the vacuum-boxes or suction-boxes, which form parts of that class of machines; and my invention consists, first, in an improved method of exhausting the air and extracting the water from the suction-boxes; and, secondly, in the construction and combination of parts, as hereinafter more fully described and claimed, of an air-exhausting and water-extracting apparatus adapted to be used in connection with the vacuum-boxes or suction-boxes of the machine, which is adapted to operate continuously and without injury to the pulp or to the traveling web of wire-cloth or felt upon which this is disposed. By the use of my apparatus a perfect working-vacuum is constantly maintained in the suction-boxes, even if air should be admitted into the ends of the boxes; and it will allow the water to be extracted from the edges of the paper in course of manufac-

ture as thoroughly and completely as from the middle part or body of the sheet, and without breaking the vacuum.

On the accompanying drawings, A represents the suction or vacuum boxes, which are connected by the pipes B B B to the horizontal pipe B', which connects with the receiving-chamber C. The latter may be made of brass, iron, wood, or any other suitable material, and is by preference in the shape of a cylinder. Into the top part of the receiving-chamber is inserted an air-pipe, D, which connects the receiving-chamber with an air-pump, F. The latter is provided with four check-valves, (shown at E,) two of which connect with the air-pipe D, while the other two are connected by a pipe, J, with an air-reservoir, K, provided with an adjustable safety-valve, L, by adjusting the weight T of which the pressure within the reservoir may be regulated. The air-reservoir K is connected by a branch pipe, J', having a stop-cock, V, with a jet-pump, S, and through it with the discharge-pipe M of the receiver C, said pipe M being carried down to the basement, where it empties near the bottom of a water tank or barrel, N.

The receiving-chamber C is provided with a float, O, the stem of which has a conical metal plug, P, adapted to fit into the conical mouth of air-pipe D. In the lower part of the receiving-chamber is a suitably-constructed seat, R, adapted to support the float when it is at rest, or not in operation, said seat being located some distance above the mouth of the inlet-pipe B'. The air-pipe D, which connects the receiving-chamber with the air-pump, is provided with a vacuum-gage, H, and also with an air-valve, G, which is provided with an adjustable weight, U, for the purpose of regulating the vacuum, the weight being capable of adjustment in such a manner that the valve may be partially opened to let in air from the outside. The air-pump is operated by the rotary shaft I, having a disk, I', wrist-pin I'', and pitman I''.

The operation of this apparatus is as follows: The air-pump F, being set to work, will exhaust the air, through the appropriate check-valves E and pipe D, from the receiver C, at

the same time discharging the air so exhausted through the opposite set of check-valves, E, and pipe J into the air-reservoir K. The pump is a double-acting pump, so that it will exhaust from the receiver C and discharge into the reservoir K both at the up and down strokes. In other words, the pump will operate continuously with reference to the receiver C and reservoir K, the check-valves E being arranged to operate alternately in pairs, in a manner readily understood. As the air is exhausted from the receiver C a vacuum is established therein, and also in pipe B' and its branch pipes B B B, which, as we have seen, communicate with or discharge from the vacuum-boxes or suction-boxes A. This draws the water from the pulp through pipes B B B and B' into the receiver, from which it is discharged through pipe M into the tank N, located below. Should the vacuum in the receiver C be too great, so as to fill it with water from the suction-boxes, the float O will rise, and the conical plug or stopper P will close the inlet to the air-pipe D, and thus prevent water from passing into the air-pump. Thus it will be seen that water cannot possibly pass from the receiver into the air-pump, and should the vacuum-pressure either in the pump or in the receiver be too great, so as to interfere with the working of the apparatus, the external atmospheric pressure will overcome the resistance of valve G, which will open and admit air into the pump, as well as into the receiver, through pipe D, causing the float to drop back upon its seat, and feeding a sufficient quantity of air to the pump to enable it to work evenly and continuously. The column of water in pipe M is forced down into tank N by the pressure of the compressed air from tank K, which, escaping through the contracted nozzle of the jet-pump S, creates a downward draft in pipe M sufficient to overcome the vacuum in the receiver C. It is obvious that I do not limit myself to any particular construction of the air-pump, so that it is adapted to operate continuously; and a rotary pump or fan-suction pump may be used, if desired, instead of the reciprocating plunger-pump shown in the drawings. Steam may be used for operating the jet-pump S, instead of compressed air, if desired.

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

1. The hereinbefore-described method of exhausting the air and extracting the water from the vacuum-boxes or suction-boxes of paper-machines, which consists in continuously exhausting from the boxes into an air-tight re-

ceiver connected with an air-pump adapted to establish and maintain a vacuum therein, substantially as and for the purpose shown and set forth.

2. The combination, with the vacuum-boxes or suction-boxes of a paper-machine and their several discharge-pipes, of a common connecting-pipe, a closed receiving-chamber provided with an air-pipe, a float for closing automatically the inlet to the air-pipe, and a discharge-pipe, and an air-pump adapted to exhaust the air from the receiver, substantially as and for the purpose shown and set forth.

3. The combination, with the vacuum-boxes or suction-boxes of a paper-machine and their several discharge-pipes, of a common connecting-pipe, a closed receiving-chamber provided with an air-pipe, a float for closing automatically the inlet to the air-pipe, and a discharge-pipe, an air-pump adapted to exhaust the air from the receiver, an air-reservoir adapted to receive and store the air from the receiver and connecting with the pump, and a branch pipe connecting said storage-reservoir with the discharge-pipe of the receiver, substantially as and for the purpose shown and set forth.

4. The receiver C, having inlet-pipe B' and discharge-pipe M, and provided with the float-seat R, float O, having conical plug or stopper P, and air-pipe D, having a conical opening adapted to fit and be closed by the plug, substantially as and for the purpose shown and set forth.

5. The described apparatus for exhausting the air and extracting the water from the vacuum-boxes or suction-boxes of a paper-machine, the same consisting of a closed receiving-chamber provided with an air-pipe, a float for closing automatically the inlet to the air-pipe, and a discharge-pipe, an air-pump adapted to exhaust the air from the receiver and discharge it into an air-storage reservoir provided with a safety-valve for regulating the pressure, an air-storage reservoir, an air-pipe connecting said reservoir with the discharge-pipe, a jet-pump inserted into the discharge-pipe where it connects with the pipe from the air-reservoir, and a tank or receptacle into which the discharge-pipe feeds, all constructed and combined substantially as 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.

JOHN JOSEPH MANNING.

Witnesses:

AUGUST PETERSON,
LOUIS BAGGER.