(No Model.) 2 Sheets—Sheet 1.

J. J. MANNING.

METHOD OF AND DEVICE FOR WASHING THE FELT IN PAPER MAKING MACHINES.

No. 305,615. Patented Sept. 23, 1884.

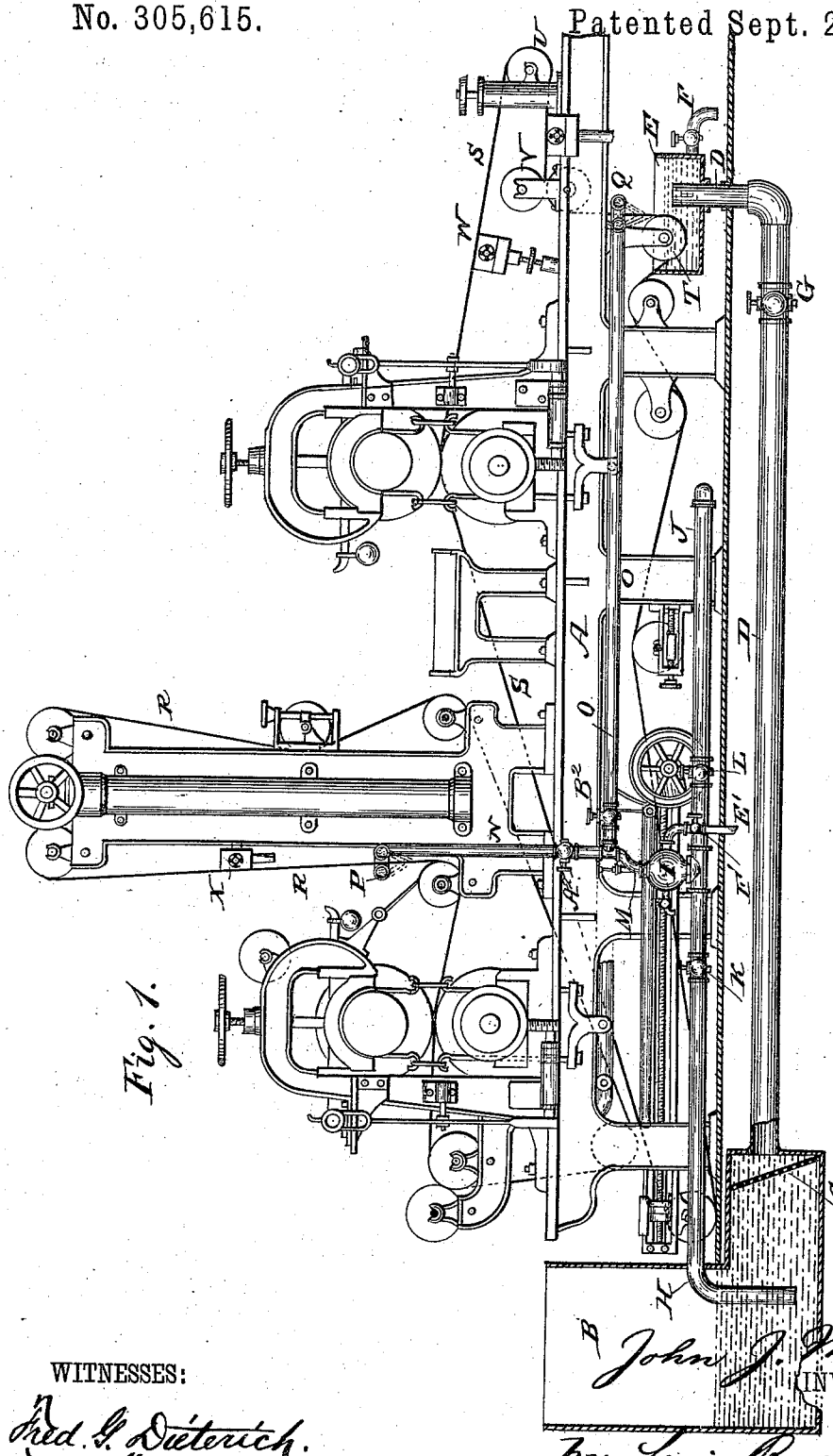


Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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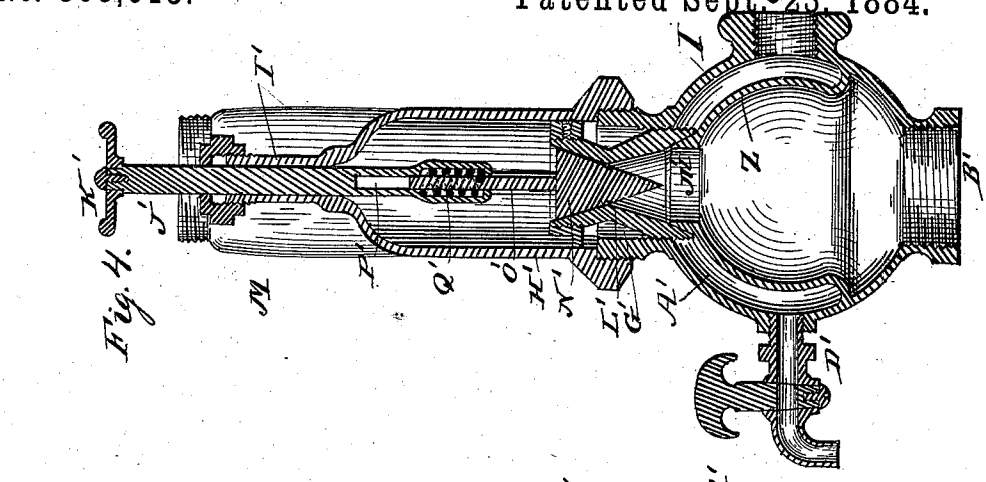


Fig. 4.

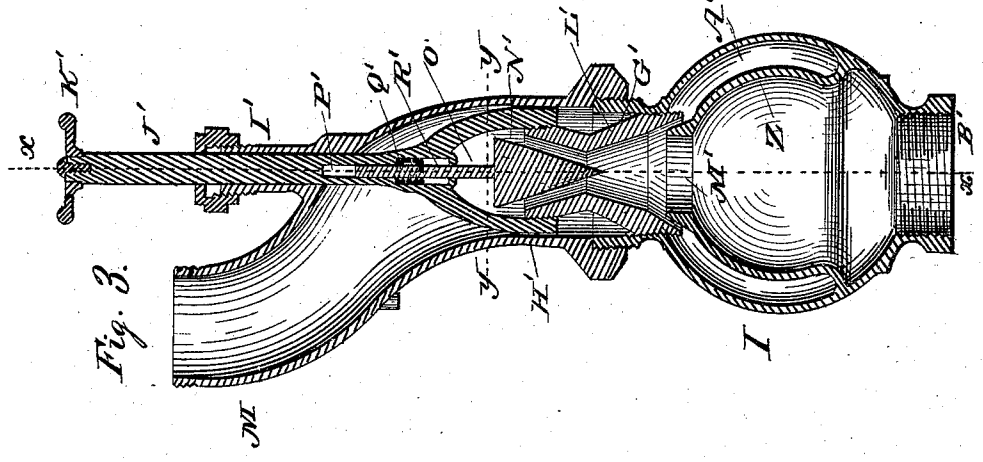


Fig. 3.

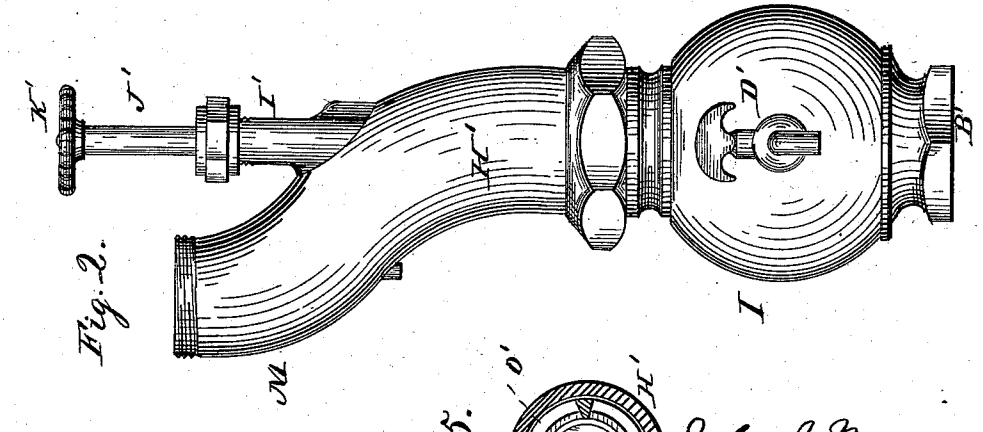


Fig. 2.



Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN J. MANNING, OF GREAT BARRINGTON, MASSACHUSETTS.

METHOD OF AND DEVICE FOR WASHING THE FELT IN PAPER-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 305,615, dated September 23, 1884.

Application filed June 11, 1884. (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 Methods of and Devices for Washing the Felt 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 a paper-making machine to which my invention has been applied. Fig. 2 is an elevation, on an enlarged scale, of the suction-pump used in connection with my invention. Fig. 3 is a vertical longitudinal sectional view of the same. Fig. 4 is a vertical sectional view taken on the line *x x* in Fig. 3, and Fig. 5 is a horizontal sectional view taken on the line *y y* in Fig. 3.

The same letters refer to the same parts in all the figures.

This invention relates to paper-making machines; and it has for its object to provide an improved construction and arrangement of parts, whereby the felts may be continually washed and cleaned without stopping the operation of the machine. By my improved method or process, as carried out by the construction and arrangement of parts to be hereinafter described, all accumulations of foreign substances—such as glucose, resin, clay, alum, and the like—which are used in the manufacture of paper, will be removed. The cause of the felt becoming dirty is as follows: The felt is an endless woolen apron, made of a suitable length to suit the machine to which it is applied. The felt during operation rotates with greater or less rapidity, and serves to convey the paper in a moist pulpy state from machines of the type known as "cylinder-making molds," and those known as "Fourdrinier" machines. After the pulp has passed onto the felt fabric it is conveyed between the press-rolls, which are used for squeezing and pressing the moisture out of the paper and through the felt, and after passing for some time in this manner the felt becomes coated with the various substances contained in the paper-pulp. It then becomes necessary to wash the felts, and this has heretofore been accomplished either by removing the felt entirely from the machine and placing it in a so-called "felt-washer," in which is placed a quantity of soap or other liquid solvents, which are heated to any desired temperature, and after the felt becomes clean it is necessary to hang it out to dry. So that it will be seen that this is not only a slow process, but it is necessary to stop the machine while the dirty felt is being removed and a clean one substituted. Continuous felt-washing devices have also been applied to paper-making machines in which pipes are provided for applying sprays or showers of water continuously to the felt as it passes between said pipes. A beater is then applied, which is rotated at a rapid rate, and the wings of which constantly strike the felt after it passes over the showers of cold water. While the felt is going through this process it is necessary to suspend the manufacture of paper on the machine, and after the felt becomes clean the washing process is in turn dispensed with. In the above manner the felt can only be partially cleaned, and the constant striking of the beater against the woolen fabric destroys the warp of the felt and hastens its destruction. When the felt becomes hard and thick from washing in the above manner, it is therefore necessary to take it off the machine and clean it thoroughly in the machine known as a "felt-washer," to which reference has been made above.

My invention consists in an improved method or process and an improved apparatus for washing the felt continuously by the application of proper chemicals or liquid solvents without removing the felt from the machine at any time, provision being made for reclaiming the chemicals, when desired, to be used over and over again as often as may be deemed proper. The invention further consists in the improved construction of the pump, whereby either the liquid solvents or clear pure water may be delivered at any desired degree of pressure and at various degrees of temperature to the shower-pipes.

The invention further, and finally, consists

in the improved construction and arrangement of details, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings, A designates the frame of a paper-machine to which my invention has been applied, and which said frame is of the usual construction. B is a suitably-constructed tank arranged at one end of the said frame, or in any other suitable position, and adapted to contain the liquid solvents, which are to be used for the purpose of cleaning or washing the felts of the machine. The lower portion of the said tank is provided with a perforated diaphragm or strainer, C, and the rear end of the tank is connected by a pipe, D, with another or receiving tank, E, arranged below the shower-pipes. It will be seen that the pipe D is an overflow-pipe, extending upwardly for some distance into the tank E, which latter is provided with a cock or faucet, F, through which its contents may be drawn off when desired. The pipe D is provided at a point near the tank E with a valve, G, for the purpose of regulating the passage of liquids from the tank E back into the tank B.

H is a pipe leading from a point near the bottom of the tank B to the pump I, from which it extends, as shown at J, to a suitable water supply or reservoir, which, however, is not shown in the drawings. Valves K and L are provided for the purposes of admitting either the liquid solvent from tank B or pure water through the pipe J to the pump.

M is the exit-pipe of the pump, from which branches N and O lead, respectively, in an upward and rearward direction, to the spray or shower pipes P and Q, the former of which are arranged on opposite sides of the short felt R, while the latter are arranged to throw jets of water against the upper and under sides of the long felt S. The latter passes over a guide-roller, T, which is submerged in the tank E, directly above which the spray-tubes Q are arranged. On emerging from tank E the felt S passes over and between suitable guide and squeeze rollers, denoted, respectively, by V and U, thence over a suction-box, W, which serves to remove superfluous moisture from the felt, and thence through the remaining parts of the machine, which, as stated, are of ordinary construction. The short felt in like manner passes over suitable guides and rollers, it being acted upon during its passage by the spray from the pipes P, above which a suction-box, X, is arranged for the purpose of removing superfluous moisture.

The pump I consists of a spherical chamber, within which a shell, Z, is formed, which occupies nearly three-fourths of the periphery of the said chamber, between the wall of which and the said shell a chamber, A′, is formed. The lower part of the chamber I has the water-entrance B′, and its sides are provided, respectively, with the steam-entrance C′, which communicates with the chamber A′, and the faucet D′, which likewise communicates with the said chamber. Steam is supplied through a suitably-arranged pipe, E′, Fig. 1, which is provided with a valve, F′, for the purpose of regulating the quantity of steam admitted into the pump. The upper portion of the shell I has an escape opening, G′, over which is fitted the exit-tube H′, which is bent or curved, as shown, and provided with a neck, I′, which is in a line with the vertical center of the shell, and which serves as a guide for the valve-stem J′, having at its upper end a hand-wheel, K′, by means of which it may be conveniently operated. The lower end of the said valve-stem is bifurcated, and carries a double valve-seat, L′, the lower end of which is adapted to engage and close the opening M′ at the upper end of the shell Z, inside the pump-casing. The upper end of the seat L′ engages a conical valve, N′, formed upon a stem, O′, which slides vertically in a recess, P′, formed at the lower end of the stem J′, and forced automatically in a downward direction by the action of a spring, Q′, arranged in a chamber, R′, formed in the lower end of the said valve-stem J′.

It will be seen that when steam is admitted into the pump through the entrance C′ it will pass through the chamber A′ up through the valve-seat L′, which latter may be adjusted, by means of the valve-stem J′, so as to regulate the quantity of steam admitted and the force with which it shall be allowed to pass through the pump. The steam on its upward passage will raise or lift the valve N′ against the tension of the spring Q′, the conical shape of the said valve serving to intercept and divide the steam, so as to cause it to pass in an even volume through the exit-pipe. The suction thus created will cause the water or other liquid to rise in the interior portion of the main shell of the pump-body, whence it passes through the opening M′ at the upper end of the shell Z; thence upward through the valve-seat L′, where it mingles with the steam, and finally out through the exit-pipe H′ M, through which it is conveyed to its destination. Through the faucet D′ the water of condensation may at any time be drawn off from the chamber A′, thus preventing the oxides from mingling with the liquid solvents and discoloring the paper.

The operation of this invention will be readily understood from the foregoing description, taken in connection with the drawings hereto annexed. When it is desired to apply suds or other liquid solvents to the felts of the machine, the valve L must be closed, and the valve K, which connects the pump with the tank B, must be opened, as well as the steam-valve F′, through which steam is admitted for the purpose of operating the pump. The pipes N and O, leading to the shower pipes or tubes P and Q, are provided with valves A^2 and B^2, by means of which the liquid may be conveyed to either or both of the felts. When it is desired to reclaim the liquid and use it over again, the valve G in pipe D is opened, thus conveying the liquid from the tank E back into

the tank B, from whence it is again taken by the pipe H and conveyed to the pump. The strainer C will serve to remove any fibers or other obstructions from the liquid as it enters tank B. When it is desired to apply only pure cold water to the felt or felts, the valve K is closed, and the valve L, which regulates the supply of pure water through the pipe J, is opened, thus causing the water to pass from the said pipe into the body of the pump, and thence through the pipes N and O to the spray-tubes. The felts, after passing between the spray-tubes, are carried by the several guide-rollers over the suction-boxes, the operation of which is obvious.

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

1. A method or process of cleansing the felts of paper-making machines, which consists in applying the cleansing-liquids to the felts while the machine is in operation, by means of spray or shower pipes, squeezing the felts, and gathering such liquids in a receptacle connected with the source of supply, so that the said liquids may be used over again as often as may be desired, substantially as set forth.

2. In a felt-cleaning attachment for paper-making machines, the combination of a supply-tank, means for carrying the cleansing-liquids from the latter to the spray-pipes, by which it is thrown against the sides of the felt, means for squeezing or pressing the wetted felt, a tank adapted to receive the spray or drippings, and a pipe connecting the said receptacle with the supply-tank, which latter is provided with a perforated diaphragm or strainer, substantially as set forth.

3. In a device for continuously washing the felt or felts of paper-making machines, the combination of the supply-tank, a pump adapted to raise the liquid from the same and convey it through suitable exit-pipes to the felt or felts, suitable regulating-valves, means for squeezing or pressing the wetted felt or felts, a tank adapted to receive the surplus liquid applied to the felt or felts, and a pipe connecting the said tank with the supply-tank, and equipped with a suitable regulating-valve, substantially as set forth.

4. In a device for continuously washing the felt or felts of paper-making machines, the combination of a supply-tank having a suitable strainer, a pipe connecting the said supply-tank with a receiving-tank adapted to receive the surplus liquid applied to the felt or felts, a suitably-arranged suction-pump, and a pipe connecting the liquid-entrance of the latter with the supply-tank and with a suitable source of supply of pure water, and valves arranged to connect the pump either with the supply-tank or with the pure-water supply, substantially as set forth.

5. In a device for washing the felts of paper-machines, the herein-described suction-pump, consisting of a spherical body having an interior shell provided with an opening at its upper end, a liquid-entrance at the lower end of the said outer shell, a steam-entrance and waste-cock connecting with the space or chamber between the inner and outer shells, a double conical valve-seat connecting the interior of the inner shell and the chamber between the inner and outer shells with the exit-pipe, the said valve-seat being adjustable, so as to regulate the quantity of steam that shall be admitted to pass, a vertical stem adapted to operate the said seat, and having at its lower end a chamber, and a conical valve having a stem fitted in the said chamber, and arranged to be forced in a downward direction by the action of a spring suitably arranged in the same, substantially as set forth.

6. In a device for continuously washing the felts of paper-making machines, the combination, with a suction-pump comprising a spherical body having an interior annular chamber, of the curved exit-pipe, a double conical valve-seat, a bifurcated stem adapted to operate and adjust the said valve-seat, a conical valve having a stem arranged to slide vertically in the lower end of the said operating-stem, and suitable steam and liquid entrances, and a condense-water escape, substantially as set forth.

7. In a device for continuously washing the felts of paper-making machines, the combination of a supply-tank having a suitably-arranged strainer, a pipe connecting the said supply-tank with a reclaiming-tank, and equipped with a suitable regulating-valve, a suction-pump having inlet-pipes connecting it with the supply-tank and with a pure-water supply, the said supply-tanks being provided with regulating-valves, a steam-pipe leading into the said pump and supplying steam for the purpose of raising the liquid and regulating its temperature, an exit-pipe having branches for conveying the liquid to suitably-arranged spray-tubes, and suitable regulating-valves, substantially as and for the purpose set forth.

8. In a device for continuously washing the felts of paper-making machines, the combination of a suitable source of liquid-supply, a suction-pump arranged to convey the liquid through suitable pipes to spray-tubes arranged at the sides of the felts, a suitable reclaiming-tank connected with the supply-tank, and suction-boxes arranged to extract superfluous moisture from the felts after passing between the spray-tubes, substantially as and for the purpose set forth.

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

JOHN J. MANNING.

Witnesses:
WM. BAGGER,
LOUIS BAGGER.