

(No Model.)

J. P. BROWNE.
PAPER MAKING MACHINE.

No. 345,274.

Patented July 13, 1886.

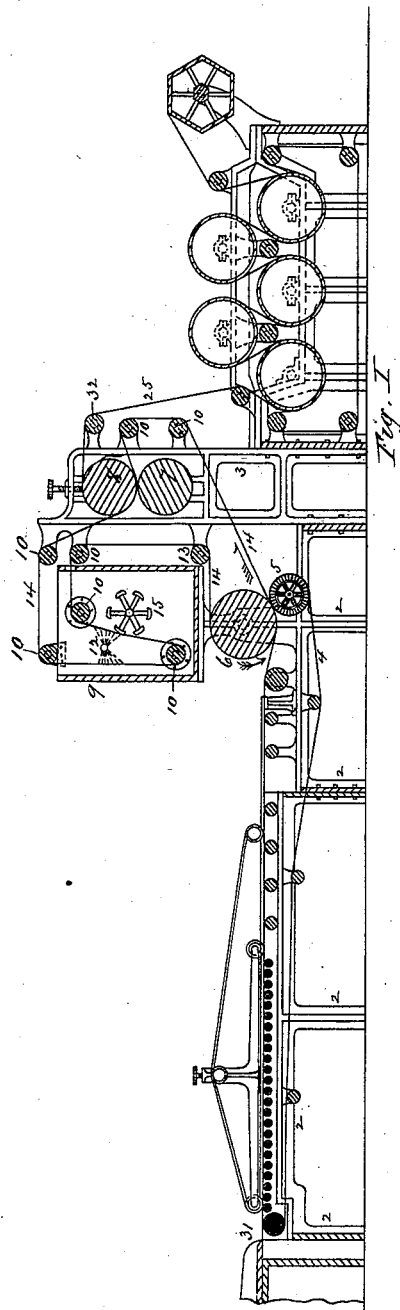


Fig. I

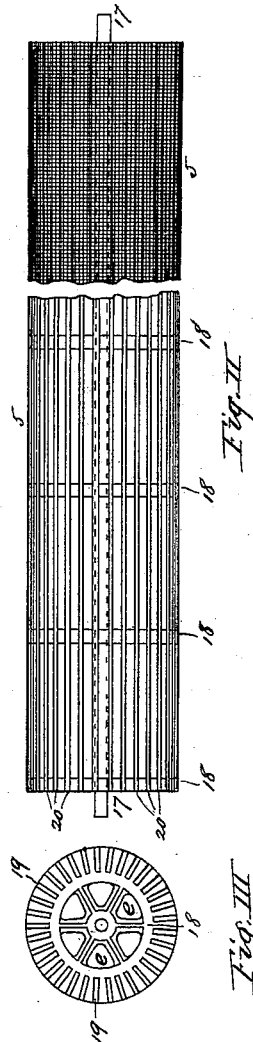


Fig. II

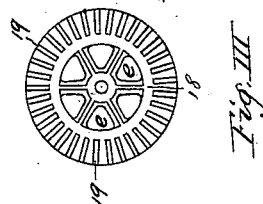


Fig. III

Witnesses.

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JOSEPH P. BROWNE, OF SOUTH HADLEY, MASSACHUSETTS.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 345,274, dated July 13, 1886.

Application filed October 17, 18-3. Renewed December 19, 1885. Serial No. 186,172. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH P. BROWNE, of South Hadley, in the county of Hampshire and State of Massachusetts, have invented a new and useful Improvement in Paper-Making Machines, of which the following is a specification and description.

The object of my invention is to provide a paper-making machine with a lower couch roll or mold having longitudinal wood bars covered with a wire fabric, and an upper couch-roll and couching-felt, by means of which the paper, as it is received from the endless wire of the machine, is given the desired degree of pressure, and is removed from the endless wire and carried to the press-rolls; and, also, to arrange the couching-felt with the upper and lower couch-rolls and with the press-rolls so that the paper need not be removed from the couching-felt until after it has been pressed, but may be carried directly from the couch-rolls to the press-rolls, and be delivered from the couching-felt, after it has been pressed, to the driers, or to the felt which carries it through the driers, and also to arrange a wash-box containing the washing mechanism above the machine, so that the couching-felt may be continuously and thoroughly washed while the paper is being manufactured upon the machine, all of which I accomplish by the mechanism substantially as hereinafter described, and illustrated in the accompanying drawings, in which—

Figure I is a longitudinal sectional view of a Fourdrinier paper-machine having my invention applied thereto. Fig. II is a front view of the lower couch roll or mold, a portion thereof being without the wire covering which operates in connection with the upper couch-roll; and Fig. III is a side view of one of the disks forming the frame of the lower couch roll or mold.

In the drawings, 2 represents the frame of an ordinary Fourdrinier paper-machine, which, from the breast 31, where the pulp is introduced upon the endless wire 4, to the upper couch-roll, 6, is of the ordinary construction. The lower couch roll or mold, 5, which occupies the same position as the ordinary lower couch-roll, consists of a series of disks, 18, of suitable metal, each provided with one or more openings, as *e*, and each having a series of radial openings or recesses, 19, made therein in

close proximity to each other, and extending inward toward its center, say, to a distance of two or three inches, as shown in Fig. III. A number of these disks 18 are used in the construction of a lower couch roll or mold, said disks being placed at suitable distances apart and firmly secured upon a shaft, 17, which extends outward a little distance at each end to form journals upon which the roll or mold may revolve in the frame of the machine. These disks being firmly secured to the shaft at suitable distances apart, with the radial openings or recesses 19 all opposite each other, or in a line in a direction lengthwise the roll or mold, I secure in these radial recesses a series of wood bars, 20, made of any suitable wood—white pine being preferable—and extending longitudinally in a direction lengthwise the roll, and whose outside edges are made flush with the periphery of each disk, and when these disks and bars are all secured firmly together I cover the whole with a fine wire fabric of suitable texture, thus forming a hollow roll whose periphery or shell is perforated with minute openings.

I am aware that hollow perforated rolls have heretofore been made, as in the ordinary lower couch-roll of Fourdrinier paper-machines; but these couch-rolls have been made with small longitudinal metallic rods, whose ends were firmly secured in the ends of the roll by riveting or otherwise; but these rolls constructed entirely of metal were very expensive in the cost of their original construction, and are very expensive to maintain. For example, if any foreign hard unyielding substance happens by accident to pass between the upper couch-roll and the lower one, the longitudinal metallic bars of the lower one would be bent inward, and, being inelastic, would remain in the position in which they were bent, and it becomes necessary in such case, in order to repair it, to remove the roll bodily from the machine and send it to the manufacturer to be repaired, it being necessary to cut the riveted ends of the rods out and put in new ones, and the upper couch-roll is also liable to be permanently injured. By making the longitudinal bars of wood, if any hard substance should pass between the upper couch-roll and the lower one, a limited number only of the longitudinal bars would be broken, and these

may be easily removed from the roll or mold without removing the latter from the machine, and new ones be easily and quickly inserted in their places by any ordinary person who may be running the machine. When made in this way, the wood bars 20 being in close proximity to each other, and of great depth, as compared with their thickness, the roll or mold is very strong, and is capable of sustaining a great pressure from the upper couch-roll, 6, much more so than the ordinary metallic roll, in which the rods are cylindrical and small or slender and bend very easily, which pressure is a great advantage in having the effect of drying the paper quicker, and of more thoroughly intermingling the fibers of the pulp. I arrange the press-rolls 7 and 8 to revolve in bearings in a suitable frame-work, 3, either made upon or secured to the ordinary frame, 2, of the machine, these rolls being arranged to revolve in contact with each other with great pressure, and a wash-box, 9, made of any suitable material and water-tight, is supported upon suitable frame-work in rear of the press-rolls 7 and 8, or above the machine, and within this wash-box 9 is arranged a rose-pipe, 12, or suitable pipe perforated with holes or longitudinal slits, and connected with the water-pipes around the machine, said pipe extending in the box in a direction across the machine, with a beater, 15, consisting, mainly, of a shaft provided with radial arms, and extending parallel with the pipe 12, and at a little distance therefrom. Suitable supporting and guide rolls, 10, are arranged to revolve within the wash-box, with other similar supporting and guide rolls conveniently disposed and arranged to revolve in the frame-work near the upper part of the wash-box, and a tightening-roll, 13, conveniently arranged to give the desired tension to the couching-felt 14. This endless couching-felt 14 extends around the upper couch-roll, 6; thence between the press-rolls 7 and 8, and runs, in the direction indicated by the arrow, from the press-rolls over the two upper supporting-rolls 10, down into the wash-box 9, and around the lower supporting-roll 10 within the box; thence up between the beater 15 and pipe 12, and over the two supporting-rolls 10 located just beneath the upper ones, and thence down around and beneath the tightening-roll 13 to the upper couch-roll, 6. An outlet-pipe is connected with the wash-box 9, to conduct away the water which enters the box through the pipe 12 in the operation of washing the couching-felt. When the machine is set in motion, the upper couch-roll, 6, revolves in the direction indicated by the arrow, and with great pressure against the lower roll or mold, much greater than is possible with the rolls now in common use, by which a great portion of the water is pressed out of the film of pulp carried between the lower roll or mold and the upper couch-roll by the endless wire, and this film of pulp from this pressure is taken from the

endless wire and adheres to the lower side of the couching-felt 14, and is carried along by the felt, as indicated by the arrow, and passes upward with the felt between the press-rolls 7 and 8, where it is subjected to still greater pressure. After passing between these press-rolls the web of paper (represented at 25) is sufficiently hard and dry to be taken by hand and without danger of breakage and passed forward over the roll 32, and thence to the drier-felt, and passed around the drying-cylinders in the ordinary manner, while the couching-felt 14 passes rearward and into the wash-box 9, where it is constantly washed by the water from the pipe 12 and the beater 15, and passes thence downward and around the upper couch-roll, 6, continuously. It will be seen that by this arrangement of a couching-felt with the upper and lower couch-rolls and press-rolls the web of paper is not handled at all until after it is pressed, instead of taking it from the lower couch-roll to another felt by hand in the usual manner. In the latter case the paper, in being passed by hand from the lower couch-roll to the felt, is handled at a point in its manufacture where it is the weakest, and it is at this point that so much of the "broken paper" is run off, the web not being sufficiently strong oftentimes at this stage of its manufacture to sustain itself even in passing from the lower couch-roll a little distance to the felt. In the use of my invention the paper is not handled at all at this point, but adheres of itself to the lower side of the couching-felt, the latter taking it or removing it from the lower roll or mold, 5, and conveying it to and through the press-rolls, (of which there may be two pairs or sets, if desirable,) after which the web is comparatively strong and tenacious, and may be transferred to the drying-felt with perfect safety.

The feature of washing the couching-felt continuously during the operation of manufacturing paper on the machine, instead of being obliged to wash it while the manufacture is stopped, is another manifest advantage in the use of my invention, as the felt is being continually cleansed from all foreign matter, which otherwise might injure or discolor the paper.

It will be seen that my arrangement of couching-felt with the couch-rolls, press-rolls, and wash-box is very compact, being all located together, and by this arrangement I am enabled to greatly reduce the length of the felt, which is no inconsiderable item, inasmuch as the felts are very expensive, and the ordinary construction of the machines necessitates the use of great lengths of felt, and as they are liable to permanent injury from very slight accidents to a very small portion, from which they are often rendered entirely worthless for use on a machine, and as these accidents are as liable to occur on the first day of their use as at any other time, it is evident that by greatly reducing the length of the felt a great expense is saved in the first cost, and if the

felt should be injured by any accident the loss thereby is not so great.

My invention is adapted to be attached to any of the ordinary paper-making machines now in use, as all that is required in making the change is to attach a very small amount of additional frame-work, as 3, to the upper part of that portion of the ordinary frame which is near the couch rolls or mold, all the other portions of the machine and its frame remaining the same.

It is obvious that I may use more than one pair or set of press-rolls 7 and 8, if it is deemed desirable, one pair above or in front of the other, by arranging the additional frame-work 3 to support them, without departing from the invention in the least. I may also use the ordinary lower couch-roll instead of the roll or mold 5, hereinbefore described, and still use my arrangement of couching-felt 14, with the press-rolls and wash-box located above the machine, as above described, and by locating the wash-box in the vicinity of the couch-rolls in a Fourdrinier machine a free admission of light is obtained to the other portions of the machine, especially to that containing the endless wire, this feature being a very important one to retain.

I am aware that it is not broadly new to wash the couching-felt while the machine is in operation. Machines have heretofore been devised in which perforated pipes have been arranged on one or both sides of the felt to throw water upon or against the same as it passes along. Wash-boxes have also been arranged below the machine, with fluted rollers therein, over or around which the felt passes, and jet or spray pipes have been used in connection with such wash-boxes; but I am not aware that wash-boxes have ever been arranged above the machine, or that a beater has ever been used in connection with a wash-box, its carrying roller or rollers, and its spray-pipes. Therefore,

Having thus described my invention, what I claim as new is—

1. The combination, with the upper couch-roll and lower couch roll or mold and the press-rolls of a paper-making machine, of a wash-box located above the machine and containing a perforated water-pipe and beater, and a couching-felt extending around the upper couch-roll and between the press-rolls and into said wash-box to the washing mechanism contained therein, and supporting and guide rolls to support and guide said couching-felt, substantially as described.

2. The combination, with the upper couch-roll and the press-rolls of a paper-making machine, of a wash-box located above the machine and containing a perforated water-pipe and beater, a couching-felt extending around said upper couch-roll and between the press-rolls and into said wash-box to the washing mechanism, supporting and guide rolls to support and guide said couching-felt, and a lower couch roll or mold containing a series of disks secured upon a shaft, and a series of longitudinal wood bars secured edgewise in a radial position and in close proximity to each other to said disks, substantially as described.

3. A lower couch roll or mold for paper-making machines, consisting of a series of disks secured to a shaft, and each having a series of recesses made radially in close proximity to each other in its outer portion near the periphery, a series of longitudinal wood bars secured edgewise in said recesses, and a wire covering secured around the outside of said bars, said roll or mold being provided with a journal at each end and adapted to revolve in suitable bearings in connection with the upper couch-roll of the machine, substantially as described.

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