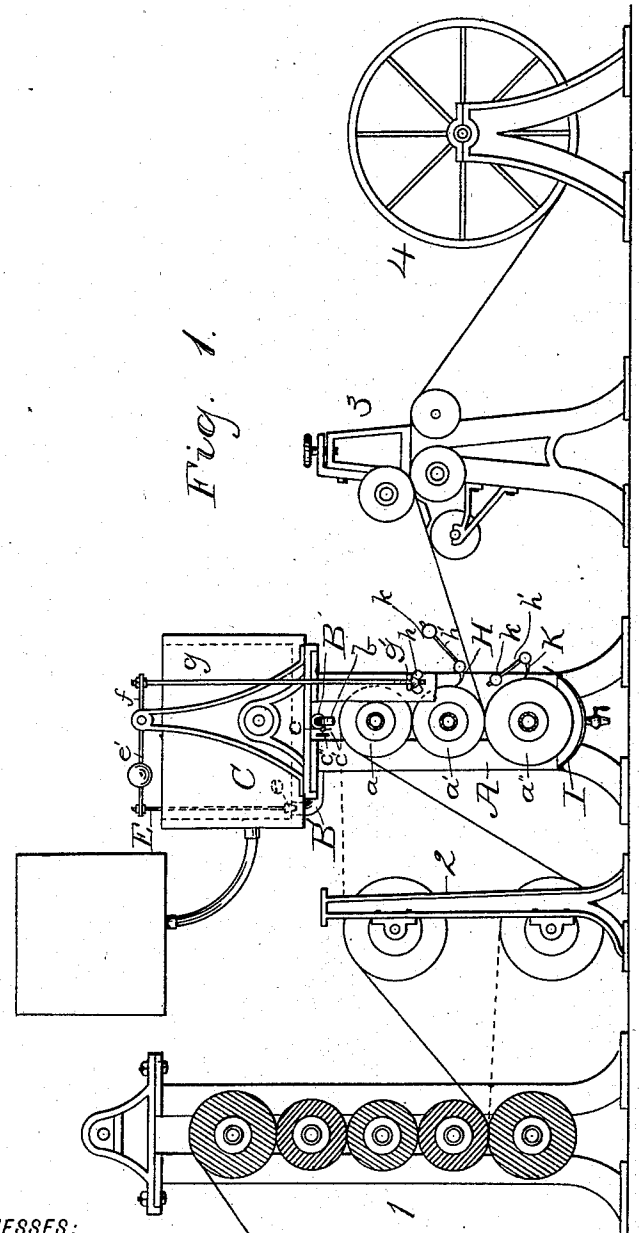
(No Model.) 2 Sheets—Sheet 1.

F. W. MILLER & J. J. NEWMAN.

PAPER WATERPROOFING MACHINE.

No. 413,286. Patented Oct. 22, 1889.

Fig. 1.



WITNESSES:

P. B. Coolidge

Robert S. Coyne

INVENTOR

Frederick W. Miller

John J. Newman

By Frank D. Thomson

their ATTORNEY

(No Model.) 2 Sheets—Sheet 2.

F. W. MILLER & J. J. NEWMAN.

PAPER WATERPROOFING MACHINE.

No. 413,286. Patented Oct. 22, 1889.

Fig. 4.

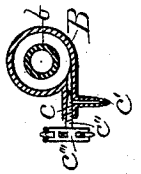


Fig. 3.

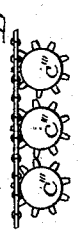
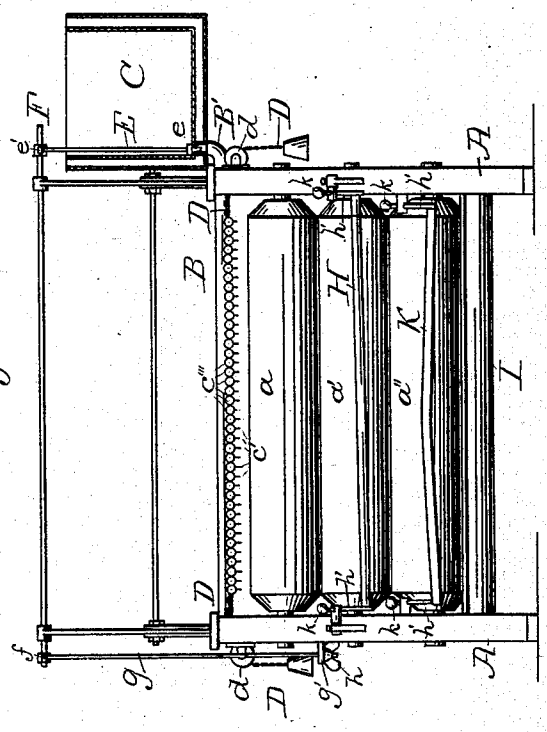


Fig. 2.



WITNESSES:

P. B. Coolidge,

Louis S. Thomason

INVENTOR

Frederick W. Miller and

John J. Newman

BY

Frank D. Thomason

their ATTORNEY

UNITED STATES PATENT OFFICE.

FREDERICK W. MILLER AND JOHN J. NEWMAN, OF ELKHART, INDIANA, ASSIGNORS TO THE GLOBE TISSUE PAPER COMPANY, OF SAME PLACE.

PAPER-WATERPROOFING MACHINE.

SPECIFICATION forming part of Letters Patent No. 413,286, dated October 22, 1889.

Application filed March 22, 1887. Serial No. 231,997. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK W. MILLER and JOHN J. NEWMAN, both of Elkhart, Elkhart county, Indiana, have invented certain new and useful Improvements in Paper-Waterproofing Machines, of which we hereby declare the following to be a full, clear, and exact description.

Our invention has for its object the providing of such new and useful improvements in paper-waterproofing machines that the paper is thoroughly and equally impregnated with the waterproofing material, and so that all superfluous waterproofing material expressed from the paper after the application of the same is removed beyond the possibility of soiling said paper during its subsequent manipulation. Our improvements are such that the paper may also be waterproofed either before or after the finishing of the paper by the paper-machine or separate therefrom, substantially as hereinafter described, and as illustrated in the drawings, in which—

Figure 1 is an end elevation of our invention, showing the same in its relative position with reference to the finishing devices of a paper-making machine for waterproofing the paper after the same is finished. Fig. 2 shows a side elevation of the same. Fig. 3 shows a side elevation of the devices for distributing the waterproofing material, taken from the side opposite to that illustrated in Fig. 2; and Fig. 4 is a transverse section of said devices.

In our Letters Patent, granted April 27, 1886, and numbered 340,810, we have described and claimed the method of waterproofing paper before the same has passed through the finishing devices of a paper-making machine. In this application we desire more particularly to describe and claim the method of waterproofing the web of paper after it has left the finishing devices. When it is desired to thus treat the paper, the web, after it leaves the last drier-roll of the paper-making machine proper, is passed through the calender-roll 1 and wound upon one of several reels journaled in the rack 2. As one of these reels on rack 2 becomes full the web is cut and wound upon one of the other reels. From the full or complete reel the paper is fed to and run through our improved waterproofing-machine, from whence it travels to and through the slitting-machine 3, and subsequently is wound upon the drum or reel 4.

The object in waterproofing the paper after it is finished, as above described, is, that the paper, not being so porous, does not absorb so much of the waterproofing material as it does when waterproofed before the finishing process. When the web strikes the uppermost calender-roll in our waterproofing-machine, (which will be more fully explained hereinafter,) it becomes reheated sufficient to spread the material previously distributed thereon, and open the pores thereof sufficiently for said paper to become thoroughly impregnated with the melted wax, paraffine, or other waterproofing material without using an excess thereof, and thereby risking the soiling of the paper during its subsequent manipulations in the machines and depreciating its marketable value.

Reference being had to the drawings, A represents a frame consisting of two standards connected at their top, and having suitable bearings for the hot calender-rolls *a a' a''*, arranged one above the other, so that their centers of revolution are intersected by the same vertical line, and so that their peripheries touch each other.

Placed transversely above and parallel with the top roll *a* is a distributing-pipe B, which is supplied with waterproofing material in a liquid state from the reservoir C, supported above and preferably on one side of frame A. Pipe B is traversed its entire length, including its connections B' with reservoir C, by a steam-pipe *b*, so as to maintain the waterproofing material in a perfectly liquid state. This pipe *b* may be the same as is used to heat the rolls *a*, *a'*, and *a''*, or it may be separate, as desired.

In order to regulate the flow of waterproofing material and thoroughly distribute the same upon the web-coursing around roll *a* beneath the same, I provide pipe B with a series of needle-valves. These valves consist of lateral pipe-stubs *c*, having a very small bore, which, preferably, is connected tangentially with the bore of pipe B. Leading downward from the bore of the stub is an aperture of about the same diameter, and de-

pending vertically downward from said stub adjacent to the mouth of said aperture is a needle-arm c'. The waterproofing-liquid flows into the stub from pipe B and out of the aperture aforesaid, leading from the bore of said stub onto the needle-arm c', upon the pointed extremity of which it forms into globules and drops off onto the paper below. The flow of material into and from these valves is regulated by the gage-screws c'', which enters stub c longitudinally from the outer end in alignment with the bore thereof, and extends into the same sufficient to cover the aperture leading from the bore to the needle-arm c'. Thus as said screws are turned it opens or closes the said aperture more or less, and regulates the flow of waterproofing material therethrough.

In order to operate all of these needle-valves simultaneously and equally, we affix to their outer ends the small sprocket-wheels c''' and engage them with a transverse chain D, which passes over them and over the sheaves d d, journaled in transverse alignment therewith in brackets secured to the outer surfaces of the standards of frame A. This chain D hangs down beside the standards of frame A, and has equipoised weights secured to its ends. Thus, by raising one or the other weights the chain engages the sprockets c''' as it moves to the right or left and turns them equally, thus regulating the flow of material, as desired.

While not deemed absolutely necessary, yet we prefer to regulate the flow of the waterproofing-liquid from the reservoir C into connection B′ and distributing-pipe B. This we accomplish by means of a plug e, which fits into the mouth of the connection B′, and is raised or lowered to open or close said pipe by means of a plunger E, on the lower end of which said plug is affixed arm e', which projects from the contiguous end of oscillating shaft F, and to which said plunger is pivotally connected arm f, projecting from the opposite end of the oscillating shaft F and in a direction opposite to arm e', and the vertical adjustment or gage rod g, extending downward from arm f, having its lower end screw-threaded and passing through a bifurcated lug g', projecting from the standard of frame A. On the lower end of this rod, below lug g', is a thumb-nut h, by turning which in one direction the rod is drawn downward and arm f oscillated in the same direction, thus turning shaft F, raising arm e', and withdrawing plug e from the mouth of the connecting-pipe B′, and permitting the waterproofing-fluid to flow into the distributing-pipe. By turning the thumb-nut in the opposite direction from that just described the operation of the contingent mechanism is the reverse, and the plug e operates to close the connection B′. We facilitate the closing of said connection B′ by placing an adjustable weight upon arm e'. This weight may be dispensed with, however.

Reference being had to Fig. 1, it will be noticed that the web of paper as it leaves the roll on rack 2 passes over and around roll a, then between rolls a and a' and around a' in the opposite direction, and finally between rolls a' and a'' to the slitting-machine. There is danger, no matter how careful the operator may be, of the superfluous waterproofing material expressed from the web, as it passes between rolls a and a', dripping off the sides of the roll a' onto the web as the latter travels toward the slitting-machine. This we avoid by the use of a scraper or doctor H, the blade of which is preferably concave longitudinally, or gutter-shaped, so that the fluid removed from the surface of roll a' will gravitate into and be conveyed to the ends of the doctor, from which it drips into the drip pan or basin I, which latter conforms somewhat in curvature to the periphery of roll a'. This doctor H is secured to the ends of arms h' h', secured in and projecting from the pivotal lugs, and have weights k k adjusted to their outer ends, so as to keep them bearing against the periphery of the roll. We also place a doctor K against the periphery of roll a'', as shown, so that should the web of paper break, instead of clinging to the said roll a'' and possibly dropping into the drip-pan, it will be scraped therefrom by said doctor and directed to the floor. Doctor K is likewise provided with arms h' and weights k, similar to doctor H, so as to keep its edge in engagement with roll a''.

We do not wish to be confined to the use of the mechanism just described for keeping the doctors in engagement with the rolls, for it is obvious other means could be supplied instead. Neither do we wish to be confined to a doctor having a curved blade, as it is obvious a straight blade could be made to answer the purpose. It is preferred, in order to facilitate the drainage of the waterproofing-fluid therefrom, to incline the doctors toward one end or the other of the rolls, or to make them higher about their centers of length than at the ends, as shown. To do this we project the scraping edge of the blades so as to conform to the curvature of the roll. We could dispense with the doctors and depend upon the proper regulation of the supply of waterproofing-fluid from the distributing-pipe B and upon the paper not breaking. We prefer their use, however.

The reservoir C is constructed substantially like that shown and described in our aforesaid Letters Patent, numbered 340,810, and is supplied from a melting-vat, into which the raw or solid wax paraffine or other waterproofing material is melted before being supplied to said reservoir. This vat, however, may be dispensed with. When it is used, though, it is constructed similar to that in the aforesaid Letters Patent.

What we claim as new is—

1. In a paper-machine, the combination, with the means for applying waterproofing

material to the web of paper, of the hot calender-rolls and doctors inclined toward one or both ends, as set forth.

2. In a paper-machine, the combination, with a reservoir, distributing-pipe, and needle-valves provided with wheels c''', of a weighted chain engaging with the said wheels, as set forth.

3. In a paper-machine, the combination, with a reservoir and distributing-pipe, of plug e, plunger E, arms e' and f, shaft F, and adjustment-rod g, as set forth.

FREDERICK W. MILLER.
JOHN J. NEWMAN.

Witnesses:
JAMES H. STALE,
JAMES O. DIETZ.