

(No Model.)

J. J. MANNING.

METHOD OF AND APPARATUS FOR CLEANING THE WIRE WEB OF
PAPER MAKING MACHINES.

No. 267,704.

Patented Nov. 21, 1882.

Fig. 1,

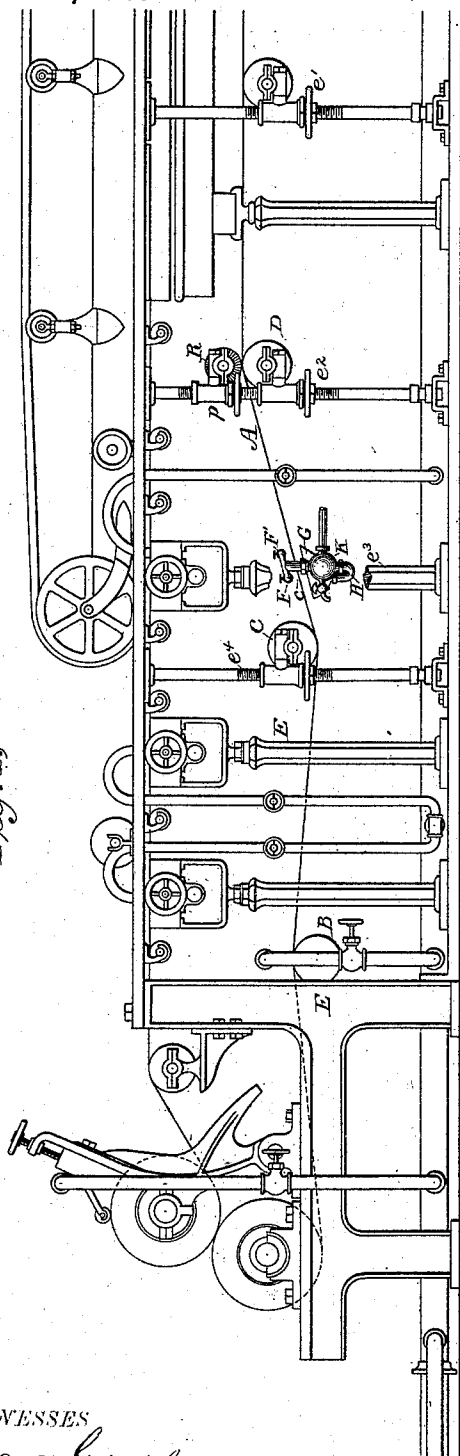


Fig. 3,

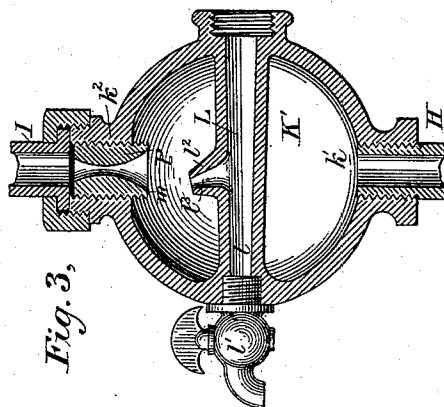
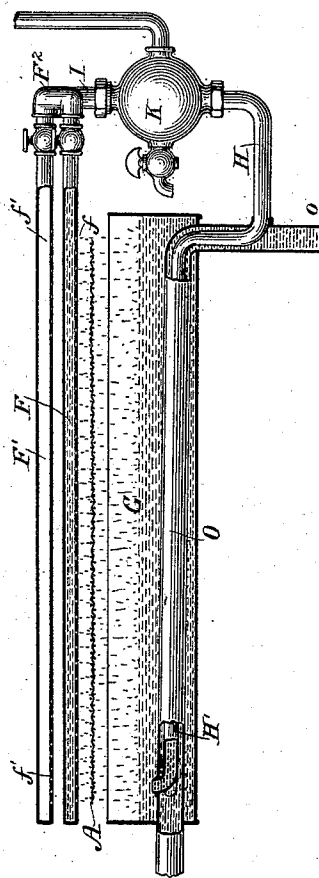


Fig. 2,



WITNESSES

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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR CLEANING THE WIRE WEB OF PAPER-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 267,704, dated November 21, 1882.

Application filed August 12, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN JOSEPH MANNING, a citizen of the United States, and a resident of Mill River, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in a Method of and Apparatus for Cleaning the Wire Web of Paper-Making Machines, of which the following is a specification.

In the operation of paper-making machines of the type known as the "Fourdrinier machine," the endless traveling web of wire-cloth which conveys the paper-pulp while the latter is undergoing the preliminary process of extracting the water therefrom becomes coated and its meshes choked and filled with various foreign substances contained in the paper-pulp—such, for example, as pitch, resin, or glucose—derived from the wood and fiber from which the pulp is made. In order that the machine may perform its functions properly, it becomes necessary to frequently subject the wire web to a cleansing process for the purpose of freeing it from extraneous and foreign substances. Heretofore it has been usual to remove such accumulations by pouring a quantity of dilute sulphuric acid upon and through the wire web as it passes over the rolls termed the "stretch-roll" or the "couch-roll." The acid is either applied in a very dilute form and the water meanwhile shut off from the wire, or the water may be left on and acid of greater strength applied. Substances which are not readily washed from the wire web by the acid application alone are removed by the use of a hand-brush. This is an extremely tedious and difficult process, and is objectionable for various reasons. The manufacture of paper is necessarily suspended during the operation, thereby occasioning the loss of much valuable time. The uneven application of the acid affects the web differently in different places, inasmuch as it destroys the anneal of the wire in places where it happens to be applied in too large quantities or with too great strength. The tension subsequently brought upon the web causes the unannealed portions of the wire to stretch more than the surrounding parts, and as the web passes between the heavy rollers loops or kinks are formed in the wires, which result in the speedy destruction of the fabric.

The object of my invention is to facilitate

the operation of removing from the wire web the accumulation of foreign substances without either interrupting the useful operation of the machine or injuriously affecting the wire of the web.

My invention consists in constructing and applying to a paper-machine of the Fourdrinier type a device adapted to project a shower of liquid solvent with great force against the traveling web, passing through its meshes while the machine itself is in operation, as during the process of manufacturing paper.

It further consists in providing means for reclaiming the said solvent and for maintaining it at any required degree of temperature, in the application of a device for drying the web and removing fibrous substances therefrom. It also comprises a particular solvent adapted to be continuously applied to the wire without injury to the web or to the jackets of the machine into contact with which it may be brought.

In the accompanying drawings, illustrating my invention, Figure 1 is a side elevation of a Fourdrinier paper-machine to which my improved cleaning device has been applied. Fig. 2 is an elevation partly in section of the cleaning device itself, and Fig. 3 shows certain details of construction.

Referring to the figures, A represents the endless traveling wire web which carries the pulp through the first stages of drying and webbing. This web is carried along by a series of rollers, B C D, which are supported in a frame, E, and revolve in suitable journals secured to the uprights e e' e'' , &c., in a manner well understood, and which need not herein be detailed. Upon one of the uprights, e'' , and preferably near the lowest roller, C, of the series, is secured the cleaning mechanism, which consists of two perforated shower-pipes, F and F', extending transversely above the wire web at c , together with a horizontal pan, G, extending beneath the wire web, and connected with the pipes F and F' through suitable connecting-tubes, H I, and a jet-pump, K, which will hereinafter be more particularly described. The tube or shower-pipe F is preferably perforated with small apertures through its lower side along the entire portion extending above the web, as shown at f , and is therefore capable of projecting a shower of suitable liquid solvent against the

entire breadth of the transverse surface of the wire web as it is carried along beneath the shower-pipe. The second tube, F' , is perforated, as above described, near its extremities only, as indicated at f' f' , and is designed to be employed to clean the edges or borders of the web only, which it is frequently desirable to do when the machine has been employed for the manufacture of narrow-sheet paper. One end of each of the tubes F and F' communicates with a tie or yoke tube, F^2 , which in turn communicates through an upright pipe, I , with the discharge-orifice of a pump, K , which is employed for forcing the solvent received from the reservoir or reclaiming-pan G under pressure into the shower-pipes F and F' .

When the wire web A is to be cleaned a sufficient quantity of a proper cleansing-solvent in liquid form is placed in the reservoir-pan G , after which one or the other of the shower-pipes F or F' is opened, accordingly as it is desired to cleanse the entire web or only its edges, and the pump K set in action. The liquid solvent is thus forcibly projected against and through the interstices of the wire web, and all foreign matter is thus removed therefrom. Dilute sulphuric acid—the solvent which has heretofore been used for this purpose—when continuously applied to the web, as before explained, destroys the structure of the wire, and it likewise injures the woolen jackets. For this reason I prefer to employ dilute hydrochloric acid, consisting of a mixture of about equal parts of commercial hydrochloric or muriatic acid and water. This may be applied continuously to the web for the purpose of cleansing it without injury to the wire or to other parts of the machine. Pure spring water or other solvents may, however, be applied by my cleansing device when desired.

Experience has shown that it is impracticable to make use of an ordinary valve-pump for the purpose of forcing the solvent through the shower-pipes in the manner hereinbefore explained, for the reason that the acid quickly acts upon and destroys the organic material of which the valves are constructed. It therefore becomes essential to employ a pump destitute of valves, and therefore especially adapted to be used in connection with the cleaning apparatus. This pump consists preferably of an external globe-shaped casing, K' , of brass, cast-iron, or other suitable material, having a suitable opening, k' , at the bottom for receiving the inlet-pipe H , and another opening, k^2 , at the top, provided with suitable means for attaching the discharge or outlet pipe I . A steam inlet-pipe, L , extends transversely through the center of the globe K' . This pipe is provided at its remote extremity with a stop-cock, and at the center of the globe K' with an upwardly-projecting jet pipe or nozzle, l^2 , consisting of a conical passage, l^2 , for allowing a jet of steam to escape into the globe K' . The bore of the horizontal tube L is preferably contracted gradually toward the extremity l , which is provided with a stop-cock, l' , in order to per-

mit the water of condensation to be blown out of the tube L before setting the cleansing device in operation, thereby preventing the solvent from being discolored by the oxide, which is liable to be formed by water standing within the pipes. Directly above the opening l^2 , and in the discharge-opening k^2 , is inserted a double funnel-shaped tube, which consists of a centrally-perforated plug, P , projecting a short distance upon the inside of the globe K' and having one of its edges, m , in line with the discharge-opening l^2 . The opening within the plug P contracts gradually from the lower extremity, m , toward its center, after which it again enlarges and opens into the discharge pipe or opening k .

The operation of the jet-pump is as follows: A sufficient quantity of the liquid solvent is placed within the pan G , from whence it flows through the pipe M into the globe K' , and rises nearly to or above the discharge-opening l^2 , which is preferably placed at a lower level than the liquid in the pan G . The steam from the supply-pipe L is then allowed to pass into the pipe and through the opening l^2 , under pressure, from whence it issues in a jet, which is projected against the edge m of the plug P , and is thereby caused to diverge from the outlet k and circulate within the globe K' . The liquid solvent contained in the globe is thereby forced into the upper portion of the globe, and the pressure of the steam forces it from thence outward through the outlet k and into the tubes F and F' . From these tubes the solution is projected through the jets f or f' against and through the wire web, from whence it falls into the pan G . Thus a continuous circulation of the liquid solution is maintained so long as the steam-jet is turned on and the operation of cleaning the wire is continued.

It is evident that during a continuous operation of the cleaning device the temperature of the solvent will be raised by the steam employed for operating the jet-pump K , and for the purpose of keeping the temperature within desired limits I prefer to place along the bottom of the pan G a cold-water pipe, O , communicating with any suitable reservoir, through which a supply of cold water is passed, escaping through the outlet o at the opposite end of the pan. Within the pipe O extends a tube, H' , opening at the extremity remote from the jet-pump K into the bottom of the pan, and at its opposite extremity communicating with the pipe H . In this manner the supply of solvent is caused to pass from the pan G through the pipe H' , where its temperature is lowered by contact with the cool surfaces of the pipe, thence escaping through the pipe H and jet-pump K , as before described.

For the purpose of more effectually removing the solvent from the wire webbing as it passes beyond the pan G , and at the same time detaching any fibrous or gummy material which may not have been removed by the solvent from the shower-pipes, I provide a revolving brush, R , attached to a standard or

upright, e^4 , just beyond the reclaiming-pan G. The brush R is caused to revolve by the mechanism for actuating the rollers of the machine, with its surface in contact with the wire webbing, and preferably bearing against the stretch-roller D. Its position with reference to the wire web A and the stretch-roll C is regulated by means of suitable adjusting-screws, p , bearing against the uprights upon which it is supported.

I claim as my invention—

1. The hereinbefore-described method of cleansing the wire web of paper-machines, which consists in continuously reapplying a solvent thereto by means of one or more shower-pipes.

2. The hereinbefore-described process of cleansing the wire web of paper-machines, which consists in continuously reapplying a solvent thereto, the temperature of which solvent is increased by the application thereto of a jet of steam.

3. The hereinbefore-described method of cleansing the wire web of paper-machines, which consists in applying thereto a solvent composed of approximately equal parts of water and hydrochloric acid.

4. A wire-cleansing device for paper-machines, which consists in the combination, substantially as hereinbefore set forth, of one or more shower-pipes, a reclaiming-pan extending beneath said shower-pipes, and means, substantially such as described, for conveying

a solvent from said reclaiming-pan through said shower-pipes.

5. The combination, substantially as hereinbefore set forth, of two or more shower-pipes united at one extremity with a common supply-pipe, and each provided with a stop-cock near that extremity, one of which shower-pipes is perforated throughout its length and the other near its respective ends only.

6. The combination, substantially as hereinbefore set forth, of one or more shower-pipes, a reclaiming-pan extending beneath said shower-pipes, an outlet for said reclaiming-pan, consisting of a tube extending along the bottom of the pan, opening at one extremity into the pan, and through the other extremity communicating with said shower-pipes, and a second pipe surrounding said outlet-tube, constructed to convey a supply of water in contact with the surface of said outlet-tube.

7. The combination, substantially as hereinbefore set forth, of one or more shower-pipes for cleansing the wire web of paper-machines, and a revolving brush adjacent to said shower-pipes for cleansing and drying said wire web.

In testimony whereof I have hereunto subscribed my name this 8th day August, A. D. 1882.

JOHN JOSEPH MANNING.

Witnesses:

WILLIAM N. BROOKS,
CHR. W. RANLET.