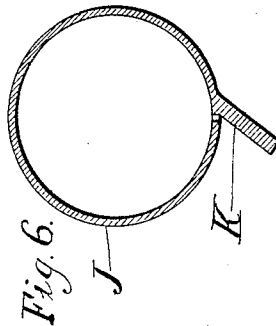
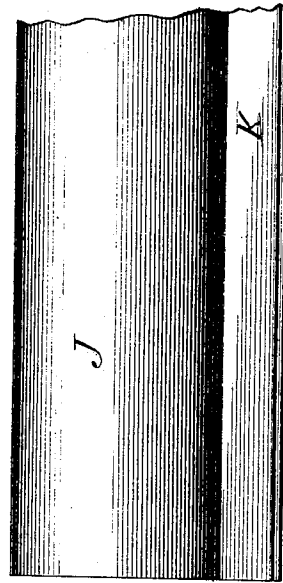
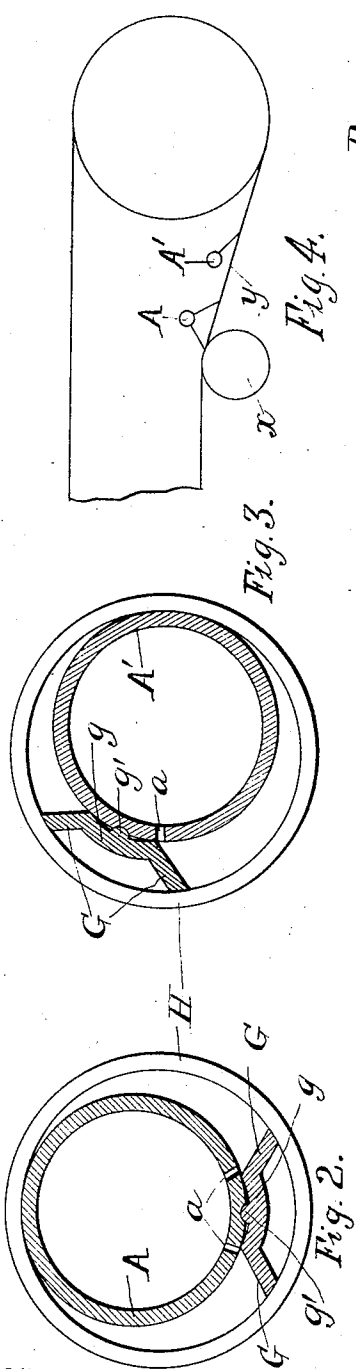


No. 782,755.

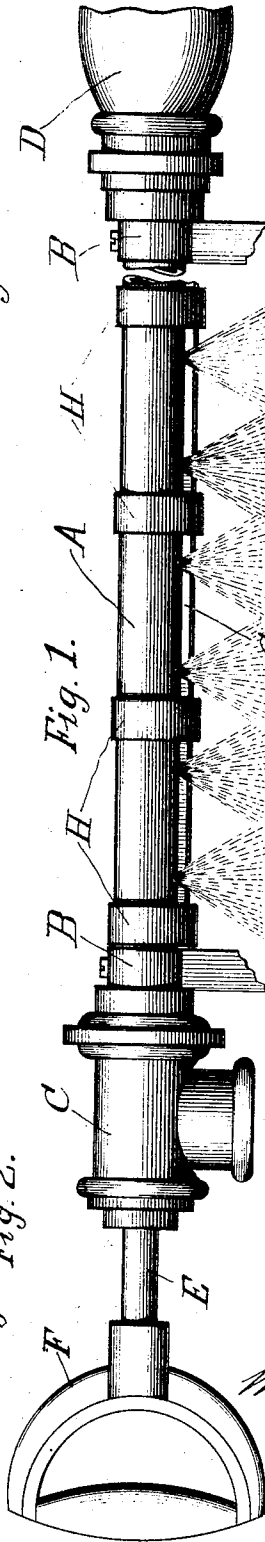
PATENTED FEB. 14, 1905.

W. H. MILLSAUGH.
SHOWER PIPE.

APPLICATION FILED MAY 14, 1903.



Witnesses
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UNITED STATES PATENT OFFICE.

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SHOWER-PIPE.

SPECIFICATION forming part of Letters Patent No. 782,755, dated February 14, 1905.

Application filed May 14, 1903. Serial No. 157,162.

To all whom it may concern:

Be it known that I, WILLIAM HULSE MILLSPAUGH, a citizen of the United States, residing at Sandusky, in the county of Erie and State of Ohio, have invented certain new and useful Improvements in Shower - Pipes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention, which is designed particularly for cleansing apparatus for paper-making machines, relates to that class of perforated tubes or pipes known as "shower-pipes" adapted for discharging water under pressure in sheet form, such as the perforated pipes employed for showering or washing the rapidly-moving making-wires and felt-conveyers, also the dandy-rolls, cylinders, and other parts of paper-making machines, to keep them free from adhering fibers and foreign substances contained in the pulp.

For economical and efficient cleansing of paper-making machinery it is essential to shower the parts to be cleansed with an unbroken forceful sheet of liquid. Examples of several forms of shower-pipes for this purpose are illustrated and described in my former United States patents, Nos. 596,939, 596,940, and 596,941, issued January 4, 1898. In each of said examples a sheet of the cleansing fluid is obtained by a discharge-pipe having a series of orifices and provided with suitable nozzles, deflecting-lips, or deflecting-planes angularly disposed to the action of the issuing streams, which impinge upon said lips or planes and thence discharge in thin sheets having diverging sides, the outer edges of which sheets all meet in the same line to form a continuous unbroken sheet. The sizes and distances between the orifices and their positions relative to their deflecting-planes determine the line at which the several streams meet, and the shower-pipe is preferably so located with relation to the parts to be cleansed as to cause such meeting-line to lie on or approximately on the surface to be showered. In these devices the deflecting lips or planes are secured to the

pipe adjustably; but in practice it has been demonstrated that the deflecting-plane must be fixed, owing to the fact that if placed adjustably a portion of each apparatus is closed and any foreign substance in the water tends to clog the outlets.

My present invention provides a shower-pipe having a line of discharge-orifices and a fixed or rigid deflecting-plate extending longitudinally thereof closely adjacent to and continuous with said line of orifices onto which all the issuing jets or streams impinge, said plate projecting from the pipe at an angle to said orifices or at an angle to a plane tangential to the circumference of the pipe when the discharge ports or orifices are formed radially, as shown in this case.

The principal objects in view are by such construction to permit a close arrangement of the discharge-orifices, which may also be correspondingly reduced in size, and thus to obtain a more even distribution of a given quantity of water, also by thus spacing said orifices more closely to allow the pipe to be placed nearer the surface or part to be cleansed, so that the water will strike with greater force and lose less energy by friction with the air, to economize in the use of the water, to insure accurate alinement of the several discharging streams or sheets, so that they will meet in the same plane and form a perfect unbroken sheet, and to provide a simpler, lighter, and more accurate and economical structure.

Another object of my present invention is to provide a construction whereby two oppositely flowing or divergent showers or unbroken sheets of liquid can be obtained from one pipe, the latter having a double series or two rows of discharge-orifices opening onto divergent planes, so that different parts of the machine may be cleansed with the same shower-pipe.

In the accompanying drawings, which are to be taken as a part of this specification, the invention is represented in different forms, each of which in addition to the characteristics and benefits above noted has its own particular advantages.

The invention will be fully described with reference to said drawings and then defined in the annexed claims.

In said drawings, Figure 1 is a longitudinal elevation of one form of shower-pipe embodying my invention, an intermediate portion of the pipe being broken away and removed for closer illustration. Fig. 2 is an enlarged vertical cross-section through said pipe, showing two lines of discharge-ports. Fig. 3 is a similar section showing a single line of discharge-ports. Fig. 4 is a diagrammatic view of a part of a paper-making machine of the well-known Fourdrinier type, showing an application of the double-shower pipe of Fig. 2 and also an application of the single-shower pipe of Fig. 3. Fig. 5 is a fragmentary front view of another form of shower-pipe embodying my invention. Fig. 6 is a vertical cross-section thereof.

Referring to Fig. 1, the letter A denotes a shower-pipe or discharge-tube which may be mounted in standards B at its opposite ends or may be otherwise suitably supported. At one end the shower-pipe is in communication through a T C with a source of water-supply under pressure, while at its opposite end the pipe may be provided with a suitable waste-valve D, which may be opened when desired to clean out the shower-pipe and allow impurities to escape through the valve-opening into any suitable waste-pipe or sewer. Said valve D may be opened by a thrust of a cleaner-rod E, extending through the pipe and projecting from its supply end, where said rod is provided with a manipulative handle F. Throughout its length the shower-pipe is perforated by a line of discharge-ports *a* or a plurality of such lines of ports, and continuous with each line of ports is a flat deflecting-plate, fixedly mounted on the pipe and projecting therefrom closely adjacent to the orifices and at an angle thereto, so that the issuing jets or streams immediately impinge on the plate and become deflected without loss of energy or waste. In this case the ports are shown formed radially, while the deflecting-plates project from the pipe immediately adjacent to the ports and at an angle to a tangential plane.

In Figs. 2 and 3 two divergent deflecting-plates G are shown formed integrally with and at opposite sides of a middle concave strip *g*, which fits against the pipe and has little lugs or teats *g'*, which fit in sockets therefor in the pipe to hold the deflecting-plates in place. A suitable number of rings or bands H fit over the pipe and plates, bearing tightly against the outer edges of the latter, and thus binding the plates immovably and strongly to the pipe without the necessity of screws or other inserted fastenings, which would weaken the parts and be liable to work loose. The construction described is not only exceedingly simple, strong, and effi-

cient, but also it enables the parts to be assembled readily and quickly, and, furthermore, a comparatively small number of the binding bands or rings are required, which is a great advantage over those constructions in which separate nozzles retained by individual bands are employed for the several discharge-ports. The pipe A (illustrated in Fig. 2) has two lines of discharge-ports opening onto the divergent planes G, while the pipe A' (illustrated in Fig. 3) has but a single line of ports. The former construction is preferred, since two diverging or oppositely-moving sheets of water can be obtained merely by the addition of the extra line of ports, a single pipe thus serving the function of two ordinary pipes.

Fig. 4 represents diagrammatically an application of both the double-shower and single-shower pipe to a Fourdrinier paper-making machine. One shower from the pipe A hits the roll *x* and the other shower from the same pipe hits the making-wire *y* several inches from the roll, thus cleaning both the roll and wire from a single pipe. The shower from the pipe A' is shown directed against the wire. It will be understood that the shower-pipe may be perforated by a greater number of lines of holes, if desired, and provided with a corresponding number of deflecting-planes to deliver several sheets of the cleansing liquid in different directions.

In Figs. 5 and 6 the invention is shown embodied in a shower-pipe J, having a line of discharge-ports and a single continuous deflecting plate or lip K, formed integrally with the pipe and projecting bodily therefrom. This construction is further advantageous for simplicity, strength, lightness of weight, and inexpensive construction, and it is adapted to emit a more economical and efficient sheet of water by virtue of a still closer arrangement of parts and reduction of their sizes.

As hereinbefore mentioned, my invention enables one to obtain a more even distribution of a given quantity of water than with prior shower-pipes having individual discharge-nozzles or deflecting-planes, since with the present pipe the discharge-ports may be made smaller and placed more closely together. Thus where in an old-style pipe the apertures are made one-eighth of an inch in diameter and the nozzles spaced three inches apart in the new pipe the apertures may be reduced in size and spaced one and one-half inches apart, so the pipe will discharge the same quantity of water in a given time through smaller and closer perforations. This arrangement also causes the different streams or sheets to meet in a continuous sheet at a line nearer the pipe, and hence the pipe may be placed closer to the part or surface to be cleansed and the water will strike with greater force, losing less of its energy by friction with the air. The delivery of the

cleansing-sheet is also better, the several streams meeting in perfect alinement by reason of the accuracy of the construction.

The invention is susceptible of other modifications and embodiments and in addition to its primary function as cleansing apparatus for paper-making machines is also applicable to other uses, such as for quenching sparks, absorption of fumes, for use on condensers, and wherever a thin sheet or shower of water under pressure is desired.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. An apparatus of the character described comprising a shower-pipe having a line of discharge-ports and closely adjacent thereto a deflecting-plate continuous with said line of ports adapted to deliver the water therefrom in a continuous sheet.

2. An apparatus of the character described comprising a shower-pipe having a line of discharge-ports and a deflecting-plate extending longitudinally thereof closely adjacent to and continuous with said line of ports and projecting from the pipe at an angle to a plane tangential to its circumference, for delivering the water from said plate in a continuous sheet.

3. An apparatus of the character described comprising a shower-pipe having a line of discharge-ports and closely adjacent thereto a flat deflecting-plate extending longitudinally thereof continuous with said line of ports and projecting from the pipe at an angle to a plane tangential to its circumference, for delivering the water from said plate in a continuous sheet.

4. A shower-pipe having a line of discharge-ports, a longitudinally-disposed member thereon having a deflecting-plane projecting obliquely to said ports to receive and deflect the streams issuing therefrom, and bands or rings inclosing said pipe and member and binding the latter to the pipe.

5. A shower-pipe having a line of discharge-

ports, a longitudinally-disposed member fitted thereagainst having a deflecting-plane located so as to receive at an angle and deflect the streams of water issuing from said ports, interfitting lugs and sockets on said pipe and member to hold them in proper relation, and means binding said member to said pipe.

6. A shower-pipe having a line of discharge-ports, a longitudinally-disposed member having a concave surface fitted against the pipe and plates on opposite sides thereof, one of said plates being disposed at an angle to said ports and constituting a deflecting-plane, and bands inclosing said pipe and member and binding the latter to the former.

7. The combination with a shower-pipe having a plurality of alined series of discharge-ports, of means for deflecting separately the discharges from said series and delivering them in different directions in thin integral continuous sheets.

8. The combination with a shower-pipe, of a longitudinally-disposed member having a concave surface fitting against the pipe and divergent plane surfaces at opposite sides thereof, a series of discharge-ports opening onto each plane surface and angularly disposed thereto, and bands inclosing said pipe and member and binding the latter to the former.

9. A shower-pipe having two parallel lines of discharge-ports, and two longitudinally-disposed divergent deflecting-plates projecting from the pipe between said lines of ports, each plate closely adjacent to and continuous with one line of ports and at an angle to the ports, whereby the issuing jets or streams from the two lines are deflected in divergent continuous sheets.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM HULSE MILLSPAUGH.

Witnesses:

WM. C. McLEOD,
SIDNEY FROHMAN.