

(No Model.)

J. BEGGS.

MOISTENING JET FOR FACTORIES.

No. 247,151.

Patented Sept. 20, 1881.

FIG. 1.

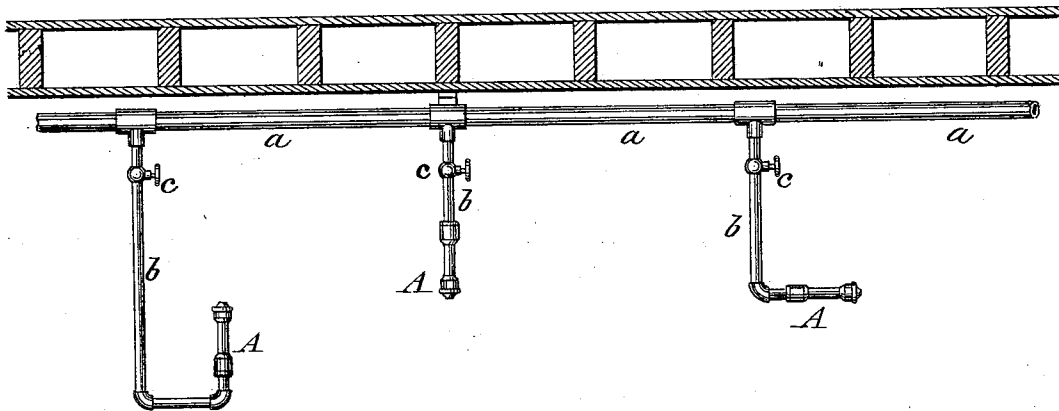


FIG. 2.

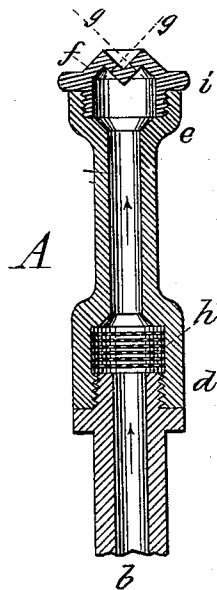
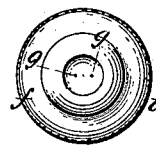


FIG. 3.



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MOISTENING-JET FOR FACTORIES.

SPECIFICATION forming part of Letters Patent No. 247,151, dated September 20, 1881.

Application filed May 5, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES BEGGS, of Paterson, New Jersey, have invented a new and Improved Moistening-Jet, of which the following is a specification.

My invention aims to provide a moistening device more particularly for moistening the air in factories for spinning silk or other fibers; and the object of my invention is to produce directly from a stream of water or other liquid under pressure a fog or mist, in distinction from ordinary spray, of such extreme fineness as will at once dissipate by direct evaporation in the air without deposition of any visible drops. This I accomplish by ejecting the water under a high pressure and in streams of capillary fineness, which are projected and impinged upon each other, so that the water is emitted with great force and velocity, and in the smallest possible quantity, and by the impingement is dispersed in the widest possible manner compared with its volume, thus producing a practical vaporization of the water, as distinguished from the crude spray hitherto produced. Furthermore, by my device this vaporization is effected by the direct pressure of the water itself, and not by the aid of an inducing jet of steam or air, as in the ordinary atomizers or sprayers heretofore used for moistening fibers in spinning, and for other purposes, which not only produce a comparatively coarse division of the water, but necessitate more expensive and complicated apparatus, and use greater power, while imparting less force to the water.

Figure 1 of the annexed drawings represents a sectional elevation of, say, a floor in a factory, with water-pipes attached to the ceiling and fitted with a number of moistening-jets projecting therefrom in different positions into the apartment below for the purpose of moistening the air thereof. Fig. 2 is an enlarged vertical section of one of my improved jets, and Fig. 3 a plan view of the top thereof.

In Fig. 1 *a* indicates a water-supply pipe, which is led from a suitable supply of water under pressure, and is extended to wherever moistening-jets are to be applied and used. The water-pipe may extend from the street-mains in places having such a water-supply,

provided the pressure be sufficient, or from an elevated water-tank, or from a force-pump adapted to charge the pipe with a sufficient pressure of water, a pressure of no less than twenty-five pounds to the square inch being desirable, while the pressure may be increased to any extent above this with better results. From the supply-pipe *a* extend branches *b* at any desired point, which are terminated with my improved vaporizing jets or nozzles *A*, and are also provided with valves *c*, by which the flow through the nozzles may be regulated or shut off, as required. The nozzles project in a downward, upward, or outward direction from the branch pipes, as illustrated, or at any desired angles, according to the point at which it is desired to deliver the mist or secure the best distribution thereof in the air of the apartment or in proximity to the spinning-machines or masses of fibers being operated upon. Hose tipped with the improved nozzles may also be led from the supply-pipe at any desired points when it is desired to guide the distribution of the mist by hand.

The special construction of the jet or nozzle is shown in Fig. 2, in which it will be seen that it is formed with an enlarged base, *d*, to screw upon the end of the branch pipe and make a tight joint with a shoulder thereon. The body of the nozzle is contracted above the base, but its bore is about the same area as that of the branch pipe, and it terminates with an enlarged head, *e*, into which the jet-tip *f* screws in the manner of a screw-cap having a broad milled rim or flange, *i*, which seats against the edge of the head, and also affords a good grasp to the fingers when it is required to screw the tip on or off to change the tips or clean out the jet-holes, should they become clogged.

The most peculiar feature of the jet or nozzle lies in the minute jet-holes *g g*, which perforate the tip of the nozzle, and are of capillary fineness, arranged at either side of the center of the nozzle, and inclined toward each other, preferably at a right angle, so that the streams emitted therefrom meet and impinge, as indicated by the dotted lines. These holes should in no case be made larger than capillary size, or rather as small as it is possible to drill the

same with jewelers' drills, so that streams of the smallest possible volume will issue therefrom, and as these streams are thus reduced to the smallest possible volume and are impelled and ejected by a high pressure directly from the water-pipes, they hence issue at great velocity, impinge upon each other, and, at first spreading out into a thin film, thence disperse in the form of a hollow inverted cone or hemisphere of vesicular vapor or mist of such exceeding fineness that in the ordinary condition of the atmosphere the mist becomes absorbed or evaporated by the air without depositing any visible drops. This is not represented in the drawings, as it is impossible to illustrate it with dots or lines on account of its exceeding fineness. This desirable result, I believe, has never been hitherto obtained, which I ascribe to the comparatively large volume of the water-jets hitherto used and the insufficient and indirect force employed to eject them.

Where the water is ejected in a large stream it is impossible to sufficiently disperse it so as to produce anything similar to mist; and where inducing-jets of steam or air are employed to impel the water-jet an exceedingly fine jet cannot be used, as the friction and resistance of such a jet are more than the indirect inducing-blast can overcome, and, moreover, such blast cannot apply the required force thereto at the emission on account of its indirection.

Where the nozzle is so formed as to discharge the stream in the form of a thin sheet this is also defective, from the fact that the volume of water in a sheet is far too large to get the widest dispersion, to obtain which the issuing stream should be reduced to the smallest hair-like dimensions and its dispersion effected by a forcible breaking up of this stream after its emission. The principle therefore of reducing the volume of ejected stream to the smallest possible extent, and at the same time increasing its force and velocity as much as possible, seems to have been heretofore overlooked or not sufficiently appreciated, which is the principle upon which my jet operates, together with the mutual impact, impingement, and dispersion of these minute fast-moving streams, which, hence, results in the production of a vaporous mist very much desired for many industrial purposes where moisteners are required.

Another feature of this jet consists in a fine sieve or filter, *h*, in the base of the nozzle, through which the water passes before it reaches the jet-tip. This is preferably formed of a number of layers of fine brass wire-cloth closely compacted together between a shoulder in the base of the nozzle and the mouth of the branch pipe on which the nozzle is screwed, as shown in Fig. 2. These layers, while acting as a sieve or filter to prevent the passage of particles which might clog the fine jet-holes, also have the important additional function of increasing the efficiency or dispersion of the

jet—that is, the effect of this sieve seems to be to separate the air imprisoned in the water as it passes through the seive, which air rises in minute highly-compressed bubbles in the upper part of the nozzle, and being ejected occasionally in jets of intense fineness and force against a similarly intense stream of water that at the same moment may issue from the opposite jet-hole, the dispersion of the issuing water is thus made intensely fine, for it will be understood that a momentary jet of air will thus alternate with a more prolonged jet of water, and while a jet of water is ejected from one jet-hole a jet of air strikes it from the next, and vice versa, thus maintaining, as it were, a continuous silent explosion of the air and water into mist.

This improved jet is not only valuable for moistening various materials in industrial operations, such as textile fibers, paper, tobacco, &c., but is also valuable for moistening the air of dwellings and at the same time sensibly cooling the same. It is also of importance in green-houses and for outdoor and indoor fountains. For fountains it possesses the important advantage that while it will produce a beautiful discharge of mist, forming a very conspicuous ornamental and cooling object, yet, owing to the intense fineness of the water dispersion and the small quantity used, but an insignificant quantity of water will suffice to keep the fountain in action for a long time, so that corporations could readily allow the use of such jets, where ordinary fountain-jets are now forbidden or heavily taxed on account of their great wastefulness.

The jet-tip *f*, as will be seen in Fig. 2, is preferably cast thin with a depressed or inverted conical center, the sides of which are parallel, or nearly so, to the jet-holes, so that the thickness of metal through which the holes have to be drilled is thus reduced.

The number of jet-holes might be increased beyond two; but it will be observed that this would not be desirable, for the greater the number of streams the less would be their force and velocity and the greater the volume, whereas the greatest possible force and least possible volume should be sought for. Two streams, as described, are by far the best, for if only one were used and arranged at its emission to strike a dispersing-plate, the dispersing effect would not be near so great as that obtained by the impact of two intensely fine and forcible streams against each other, as described, for in this case the impact and dispersion is about twice as great as would exist in the other case.

I am aware that gas-burners have been formed with two jet-holes inclined toward each other; but I am not aware that a liquid-spraying or air-moistening apparatus consisting of a supply of water under pressure and a nozzle-jet terminating the supply-pipes, and perforated with two jet-holes inclined toward each other, has ever before been employed, which

device is obviously distinct, not only in its purpose, but in its organization and in its action and results, from gas-burners and their connections, as heretofore used.

5 What I claim is—

1. The combination, with a supply of water or liquid under pressure, of a jet or nozzle connected therewith and having its jet-tip perforated with two jet-holes inclined toward
10 each other, substantially as and for the purpose set forth.

2. The combination, with a nozzle adapted to connect with a supply of liquid under pressure, of the removable jet-tip *f*, perforated with jet-holes *g g*, of capillary fineness, formed with
15 a projecting rim, *i*, and constructed to screw into the tip of the nozzle, substantially as herein shown and described.

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Witnesses:

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