F. GRINNELL.

METHOD OF DRILLING HOLES IN PIPES FOR SPRINKLING WATER.

No. 169,353. Patented Nov. 2, 1875.

Fig: 1.

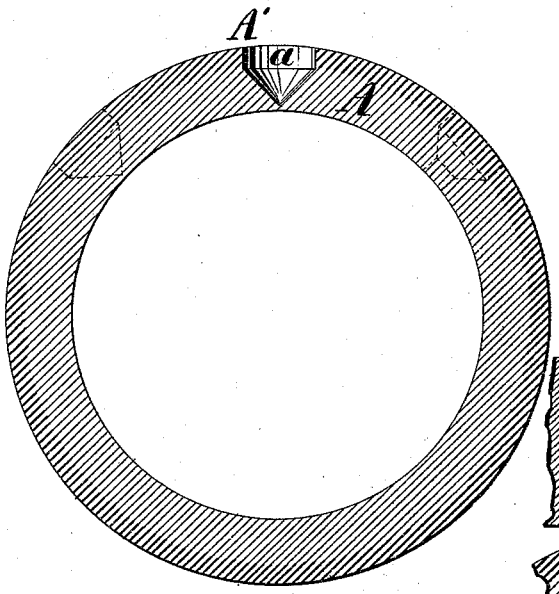


Fig: 2.

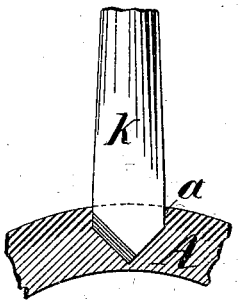


Fig: 4.

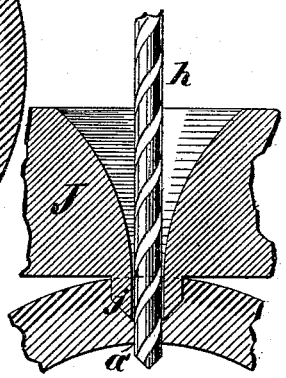
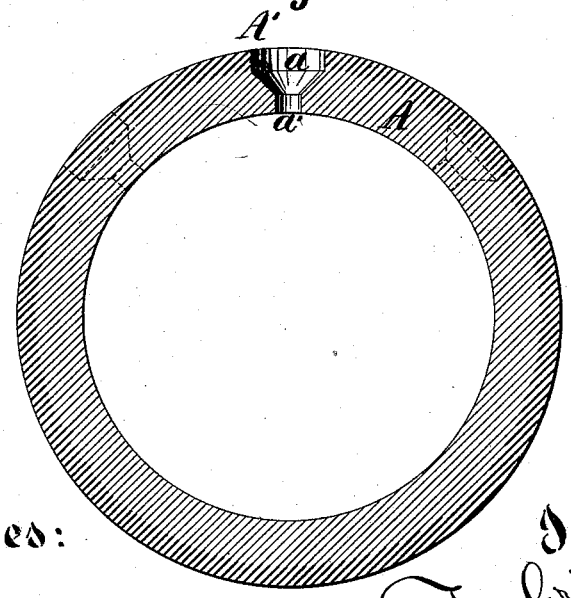


Fig: 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

FREDERICK GRINNELL, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN METHODS OF DRILLING HOLES IN PIPES FOR SPRINKLING WATER.

Specification forming part of Letters Patent No. **169,353**, dated November 2, 1875; application filed June 16, 1875.

To all whom it may concern:

Be it known that I, FREDERICK GRINNELL, of Providence, in the State of Rhode Island, have invented certain new and useful Improvements relating to Drilling Holes in Pipes for Sprinkling Water, of which the following is a specification:

Experiment has determined that water can be very effectively distributed throughout the most dangerous portions of a manufactory by means of pipes arranged near the ceiling, and connected with an elevated reservoir or pump, and having numerous perforations adapted to project the water in fine streams. It is particularly important to thus provide those portions of cotton-mills in which fine cotton is allowed to cover the floor and machinery. It is also important in the same and other parts of mills where fibrous material is allowed to become oily, and, consequently, liable to spontaneous combustion. I have devoted much time and labor to the perfection of such sprinkling-pipes. I have discovered that a hole which is large at the exterior of the pipe, but contracts somewhere near the center of the thickness, and is continued of small diameter smoothly through to the interior, throws the water in a finer stream, and to a greater distance, than any other form of aperture. The present invention consists in a method of producing such holes with economy and perfection. The exterior of the pipe is covered with a scale which is hard, and frequently irregular in its hardness, making it peculiarly trying to small drills. I drill the large hole first. After having sunk it until the point of the drill is nearly through the metal, I apply a small drill adapted for the production of a small, smooth hole, and with such drill complete the hole in the interior of the tube.

The following is a description of what I consider the best means of carrying out the invention. The accompanying drawings form a part of this specification.

Figure 1 is a cross-section of the pipe with the large holes drilled. Fig. 2 shows the large drill in the act of producing such hole. Fig. 3 is a corresponding cross-section, showing the pipe after the small holes have been continued through. Fig. 4 shows the small drill and its adjuncts in the act of producing the small hole.

Similar letters of reference indicate like parts in all the figures.

I have devised machinery by which the drills are operated simultaneously, and the operation thereby greatly facilitated—that is to say, one large drill and one small drill adjusted at a proper distance apart corresponding to one space between the apertures, or to more than one space, are moved forward simultaneously, and while the large drill is commencing a hole the small drill is completing a hole which was commenced at a previous movement. In order to aid in gaging the place of the pipe as it is fed forward at each operation I provide a bushing of hardened steel, or other suitable material, which enters the large hole and thus holds it in position, allowing the small drill to play through its center.

A is the body of the tube, and A′ the place of a hole therein. The large hole is marked *a*. It is preferably continued inward a little distance cylindrical, and then tapers to a point; but these conditions are not absolutely essential, as the jet of water issuing from the small hole *a′* does not touch the sides of the large hole *a*. The drill for the large hole is marked *k*; the drill for the small hole is marked *h*. J is the projection, preferably produced in the form of a bushing, firmly set in the machine (not represented) in the proper position to be concentric to the drill *h*. When the tube has been treated by both the drills *h* and *k*, and the drills drawn back, the tube A is drawn away from the projection *j*, on the bush J, thus setting it entirely at liberty, and is then moved forward until another hole which has been already treated by the large drill *k* comes opposite to the projection *j*, when it is engaged with such projection, and being firmly clamped by means not shown the pipe is in position to be again treated by the drills.

The operation of drilling can be conducted rapidly, calls for little labor or skill, and the drills will endure a long time. The small drill *h* may be a delicate Morse twist-drill, while the large drill *k* may be a thick, strong drill,

not necessarily very sharp, and of a character which may be forced and made to do its work with great rapidity and economy.

I do not in this patent claim the machine itself, or the peculiar product—perforated pipe having the holes of the character described—both of these points being made the subject of separate applications for patent; but

I claim as my invention—

The within-described method of drilling sprinkling-pipe, by first producing a large hole partially through from the outside, then inserting a projection, *j*, therein, and, third, continuing the hole through to the interior of a smaller diameter, as herein specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FREDERICK GRINNELL.

Witnesses:

F. H. MAYNARD,

F. W. HARTWELL.