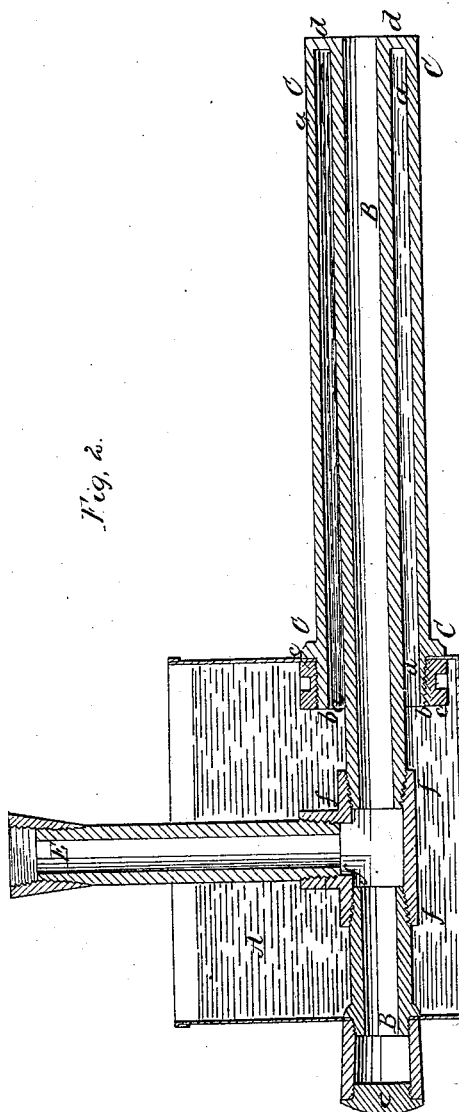
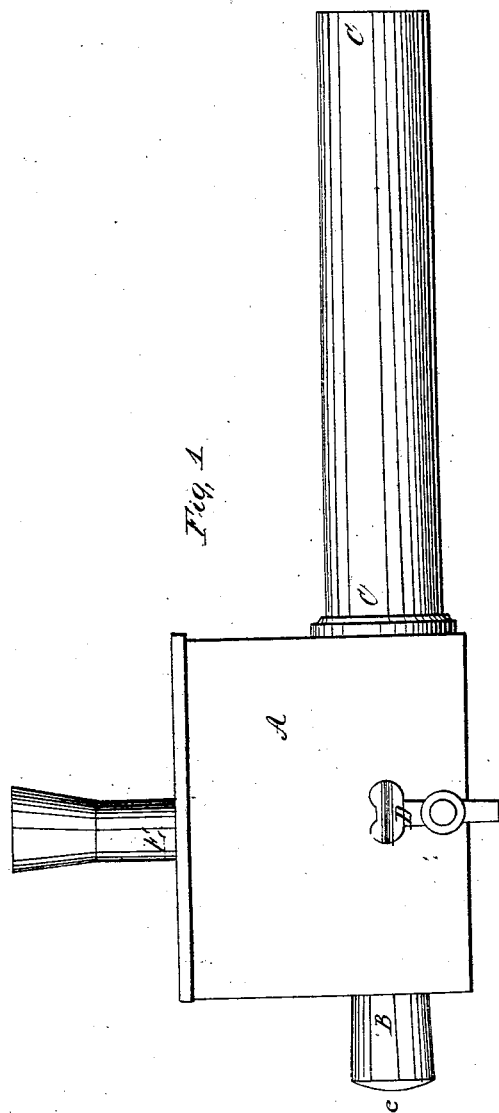


*R. D. Kincaid,*

*Tuyere,*

*N<sup>o</sup> 53,535.*

*Patented Mar. 27, 1866.*



*Witnesses*  
*J. D. Cotton*  
*N. W. Hill*

*Inventor*  
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# UNITED STATES PATENT OFFICE.

ROBERT D. KINCAID, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO  
HIMSELF AND HALL & SPEER, OF SAME PLACE.

## IMPROVEMENT IN TUYERES.

Specification forming part of Letters Patent No. 53,535, dated March 27, 1866.

*To all whom it may concern:*

Be it known that I, ROBERT D. KINCAID, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Water-Tuyeres; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a side view of the water-tuyere. Fig. 2 represents a vertical section taken centrally and longitudinally through the same.

Similar letters of reference where they occur in the separate figures denote like parts in both.

Water-tuyeres have heretofore been used in which two small water-pipes were used—one to conduct the cold water into the main pipe and the other to carry out the hot water. This made a circulation in the water; but the pipes were liable to be choked up by dirt, sediment, &c., which causes the main pipe to burn out or burst.

My invention consists in attaching the main pipe to a water box or reservoir, the attached end being left open in the inside of the water-box, so that when in use the cold water may pass in along the lower side of the main pipe to the end in the fire, and the water, when heated, return along the top side of the main pipe to the water box or reservoir, and so that if there be any dirt or sediment in the box, and it passes into the main pipe, the reaction or circulation of the water will bring it back again into the box, and thus avoid all liability of the pipe choking or being stopped up by dirt or sediment.

My invention further consists in extending the air-pipe that conducts the blast to the fire through the open end of the main pipe, and through the water-box to the opposite side, so that a bellows may be attached, and a branch pipe extending up through the water-box, so that a fan-blast may be attached, either or both, to be used, as may be desired.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A may represent a tank, reservoir, or water-

box, which may be supplied with water in any usual well-known way. Through this box, and near the bottom thereof, so as to be surrounded by water, passes the air-pipe B, that conducts the blast to the fire. That end of the air-pipe B next the fire is inclosed in an outer pipe or jacket, C, so as to leave a water-space, *a*, between the two, the inner end, *b*, of said outer pipe within the water-box being left entirely open, and secured and made water-tight by a nut, *c*, and packing, if necessary, and the outer end, *d*, of said air and jacket or water-pipe being sealed, as shown.

When the tuyere is in use and its end exposed to the fire in the furnace, the water becoming heated will pass along the upper part of the pipe and back to the water-box, while the colder water will take its place by passing in along the under side of the pipe, and thus a continuous circulation is kept up. Should there be any dirt or sediment in the water, and it should pass in with the water into the pipe, it will return or pass out again with the upper current, and thus avoid all liability of stopping up the pipe or water-space, as there are no eddies or dead water-spaces to hold or check it. When the water becomes foul or a fresh supply needed, the foul water may be drawn off at the cock D and a fresh supply let into the box or tank.

The air-pipe B, where it passes into the box A, may be packed to keep it water-tight, and may be furnished with a screw-cap, *e*, when not used, to close it up.

A vertical pipe, E, is joined to the main air-pipe at *f*. This pipe is designed to be connected with a fan-blower when such a blower is used, while a bellows may be attached to the pipe B by removing the screw-cap *e*, and both the fan-blower and bellows may be used, or either, as the case may be.

The connection of the pipe E to the main air-pipe B, as at *f*, should be tight, so as to prevent any leakage of air or of water.

Having thus fully described my invention, what I claim is—

1. In combination with a water box or reservoir, and a blast or air-pipe passing through it the sleeve-jacket or pipe surrounding said air-pipe, and open to and communicating with the water in the water-box, for the triple purpose of surrounding said blast-pipe with wa-

ter, and for allowing for a free circulation of the water, and to prevent any sediment from clogging or lodging therein, substantially as and for the purpose described.

2. In combination with an air-pipe passing through the water-box horizontally, capable of being attached or connected with a bellows, a vertical branch pipe rising up within the

box for the purpose of being connected with a fan-blower, both or either to be used, substantially as described.

ROBERT D. KINCAID.

Witnesses:

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