J. E. ATWOOD.

TUYERE MACHINE.

No. 189,295. Patented April 10, 1877.

Fig. 1

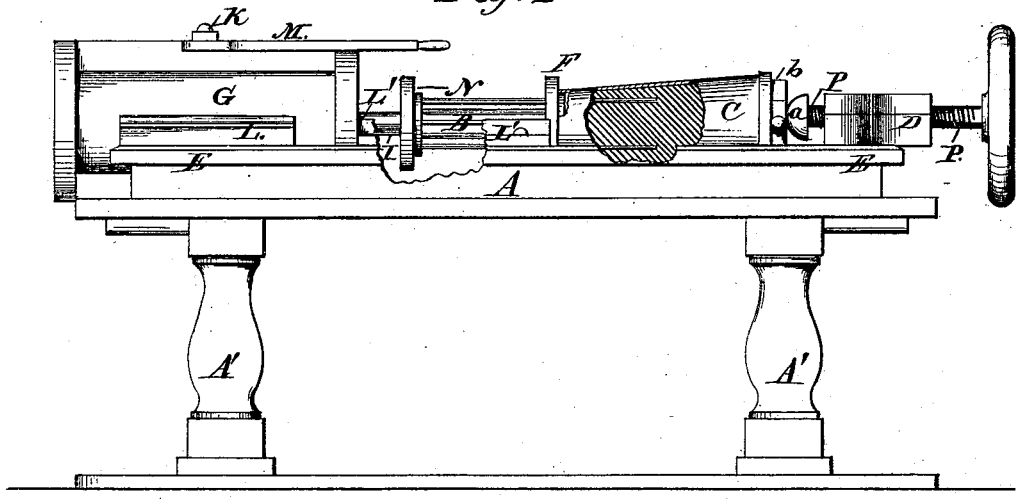


Fig. 2.

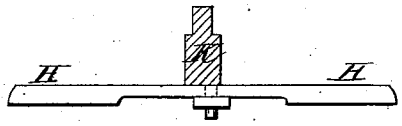
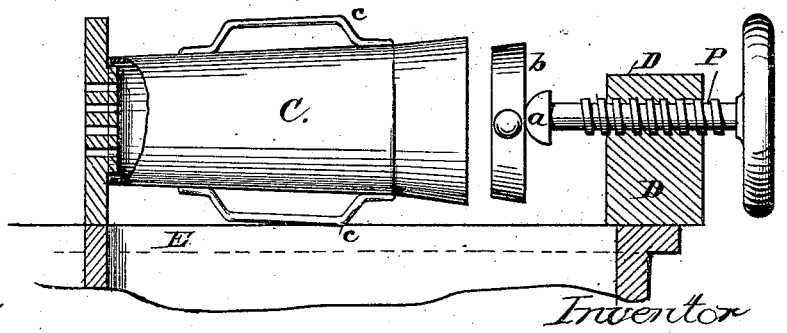


Fig. 3.



Witnesses

J. J. Mitchell

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UNITED STATES PATENT OFFICE.

JAMES E. ATWOOD, OF HARRISBURG, PENNSYLVANIA.

IMPROVEMENT IN TUYERE-MACHINES.

Specification forming part of Letters Patent No. **189,295**, dated April 10, 1877; application filed August 28, 1876.

To all whom it may concern:

Be it known that I, JAMES E. ATWOOD, of Harrisburg, Pennsylvania, have invented certain Improvements in Machines for Making Tuyeres, of which the following is a specification:

This invention relates to certain improvements in that class of machines for making tuyeres employed in converting iron into steel, into which is embodied a mold for holding the material for forming the tuyere, a series of rods adapted to penetrate the material in the mold and perforate the same, and a steam-cylinder for operating said rods to force them through the material in the mold, and to withdraw them therefrom when the tuyere has been perforated.

My invention relates to certain novel construction and arrangement of parts, which will be fully hereinafter described.

In the drawings illustrating my invention, Figure 1 represents a side elevation, showing the mold and case partly in section; Fig. 2, a detached view of the valve for controlling the piston of the steam-cylinder; and Fig. 3, a detached view of the mold, the guide for the perforating-rods, and the adjusting-screw for tamping in the material composing the tuyere.

Referring to the drawings, A represents a suitably-constructed frame, mounted upon standards A′, and E represents horizontal plates, one of which is attached in a firm and substantial manner to the opposite sides of the frame A. G represents a steam-cylinder, secured in a rigid horizontal position between the plates E by means of the lateral horizontal bars attached to the plates E, the front end of the cylinder L resting against a longitudinal projection, L′, attached to the plates E, thus firmly and securely holding said cylinder in position. H represents the valve; K, its stem, and M its handle for controlling the movement of the piston. I represents the piston-rod, and N a cross-head attached to the same. In said cross-head are secured a series of horizontal circular rods, B, passing through a fixed perforated plate, F, which serves as a guide for the rods.

D represents a fixed block or stock, attached firmly to the plates E, at one end thereof, and through which passes an adjustable screw, P, provided with a wheel, or other means for operating it, and having, preferably, a conical head, *a*, which bears against the fixed guide-plate F.

The operation of my invention is as follows: The tuyere is suitably formed by hand, or otherwise, and placed in the mold C, and the small end of the latter placed against the fixed guide-plate F. The plate *b* is then set in the open end of the mold, and the screw P adjusted to bear against the plate *b*, to tamp the material solidly in the mold. The handle M is then turned to move the valve H, to admit steam onto the piston, and force it, with the piston-rod I and cross-head N, toward the mold, causing the rods B to enter the material in said mold, and thereby forming a series of parallel perforations, the adjusting-screw P receiving and supporting the pressure from the steam-cylinder. The bars L′, it will be seen, in addition to acting as an abutment for the front end of the steam-cylinder, also subserves the function as guides for the cross-head N. The movement of the valve G is reversed after the perforations are made, and the rods B will be withdrawn from the mold by the steam acting on the opposite side of the steam-cylinder. The mold can now be removed, being provided with suitable handles, *c*, for the purpose, and the tuyere taken out and burned, in the usual manner.

I have not shown the precise construction of the valve-chest, steam-cylinder, and its inlet and outlet ports, as any one skilled can construct such with ease, the arrangement being similar to the ordinary cylinder and valve-chest of a steam-engine.

What I claim, and desire to secure by Letters Patent, is—

The combination, with the stationary plates E, of the supporting-frame, the horizontal steam-cylinder G, its piston-rod I, the cross-head N, horizontal rods B, fixed guide F, through which the rods pass, mold C, plate *b*, setting in the latter, and the horizontal adjustable screw P at the rear of the mold C, substantially as described.

JAMES E. ATWOOD.

Witnesses:

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A. H. LANDIS.