

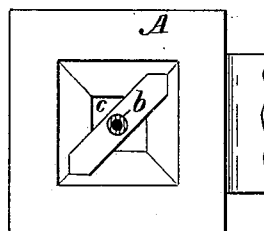
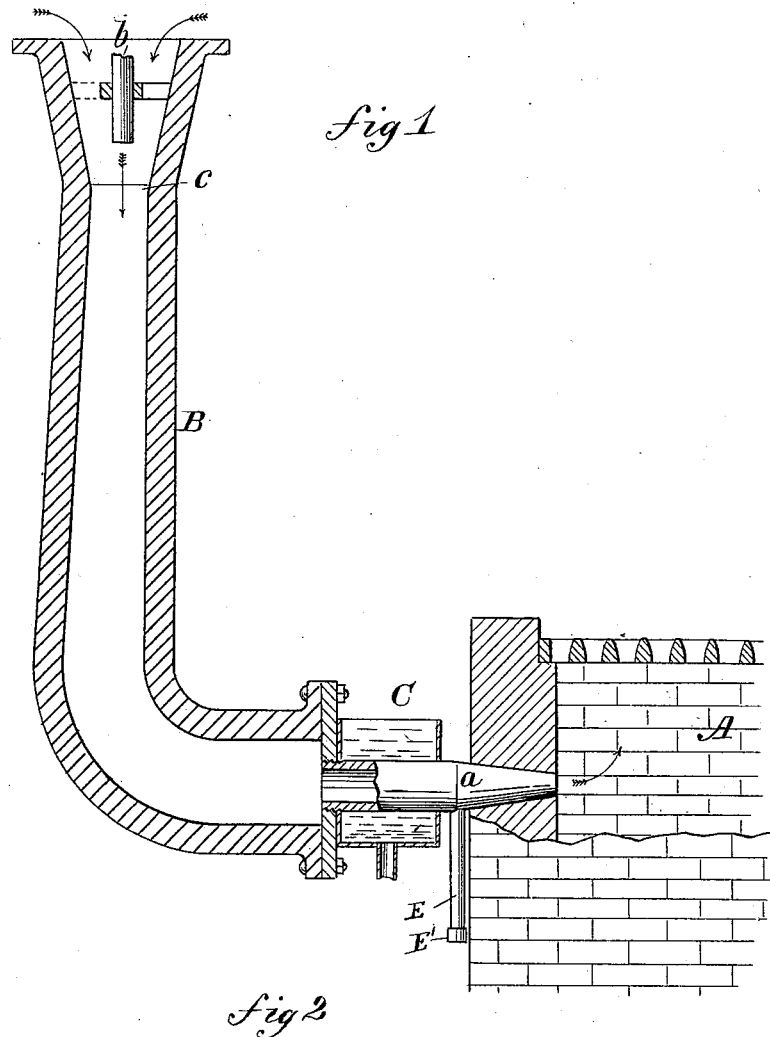
(No Model.)

J. B. DAVIS & W. WALKER.

AIR INJECTOR FOR FURNACES.

No. 266,109.

Patented Oct. 17, 1882.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JOHN B. DAVIS AND WILLIAM WALKER, OF GLENWOOD, PENNSYLVANIA.

AIR-INJECTOR FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 266,109, dated October 17, 1882.

Application filed June 16, 1882. (No model.)

To all whom it may concern:

Be it known that we, JOHN B. DAVIS and WILLIAM WALKER, of Glenwood, in the county of Lackawanna and State of Pennsylvania, have invented a new and Improved Air-Injector for Furnaces, of which the following is a full, clear, and exact description.

Our invention consists in an air-blast or injecting apparatus for use with blacksmiths' forges and furnaces for the supply of air thereto by means of a steam-jet, whereby the air is applied in a moist condition, or in the presence of moisture, to facilitate combustion, as hereinafter fully described, and pointed out in the claim.

The invention is especially applicable to furnaces and forges in which anthracite and bituminous coal and culm are burned.

The construction and operation are set forth in detail hereinafter.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation, showing our improved air-injector as applied in connection with a forge. Fig. 2 is a plan view of the injector.

A represents a forge to which the air is applied by a nozzle, *a*. B is a trunk of wood or metal, to the lower end of which is connected the nozzle *a*, and which is fitted at the upper end with a steam-jet pipe, *b*. The upper end of the trunk B is open for the inlet of air around the pipe *b*, and the pipe *b* is to be supplied with steam from a suitable generator.

The successful operation of this apparatus is dependent upon the length and proportionate size of the trunk B. From its outer and inlet end the sides of the trunk are drawn inward and focused to a point, *c*, beyond the end of the steam-jet *b*. From that point the trunk gradually enlarges to the outlet end, which is slightly smaller than the inlet-opening. The length between the throat *c* and the connection of the nozzle *a* should be such as to insure the passage of the air through the trunk, as if such length be made too short it will not give the steam the required room for expansion, and the air will not pass through. Further, the nozzle *a* being of small diame-

ter, a pressure is maintained in the trunk, insuring a steady and uniform blast of air to the forge or furnace.

In operation the steam passing through the apparatus with the air becomes partially condensed, so that it enters the forge or furnace in the form of fine particles of moisture, which aids the combustion of the fuel and prevents furnace-bars, forge-boxes, and grates from burning, and is especially advantageous in burning culm for generating steam and consuming the sulphur in anthracite and bituminous coal. The nozzle *a* passes through a water-box, as illustrated at C, for insuring the condensation of the steam to the desired extent.

With this apparatus a more advantageous blast is insured than can be obtained by a blower or fan, and it is also more economical in operation. In the burning of anthracite and bituminous coal the steam has the effect to remove or insure the combustion of all the sulphur, which, unless removed, interferes with welding operations. This has heretofore been found to be the disadvantage of using anthracite or bituminous coal containing sulphur in welding operations; but by our apparatus, which supplies steam with the air, the sulphur is entirely consumed.

The tube E projects downward from the nozzle *a*, and is to receive the condensation-water. At its lower end it is provided with a plug, *E'*, which can be opened to draw off this condensation-water, which is condensed by the water C surrounding the nozzle *a*, whereby this condensation-water will not be forced into the fire.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

In an air-injector, the combination, with the trunk B, of the outlet-nozzle *a*, the water-box C, and the condensation-water receptacle E, extending downward from the nozzle *a*, substantially as shown and described.

JOHN BENSON DAVIS.
WILLIAM WALKER.

Witnesses:

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