

E. J. JONES.

Device for Supplying Steam and Air Blast to Furnaces.

No. 200,310.

Patented Feb. 12, 1878.

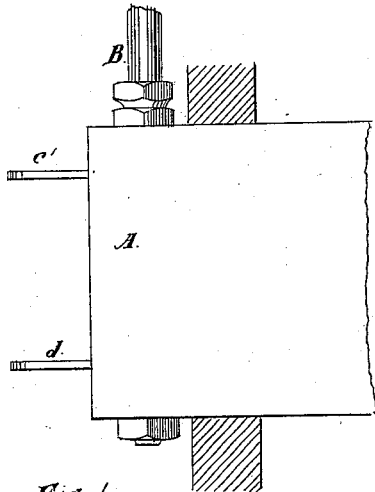


Fig. 1.

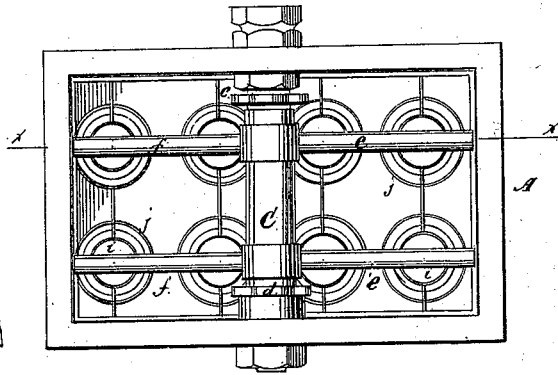


Fig. 2.

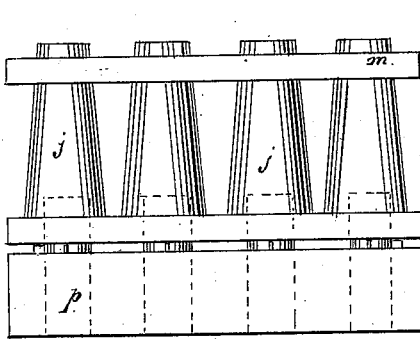


Fig. 4.

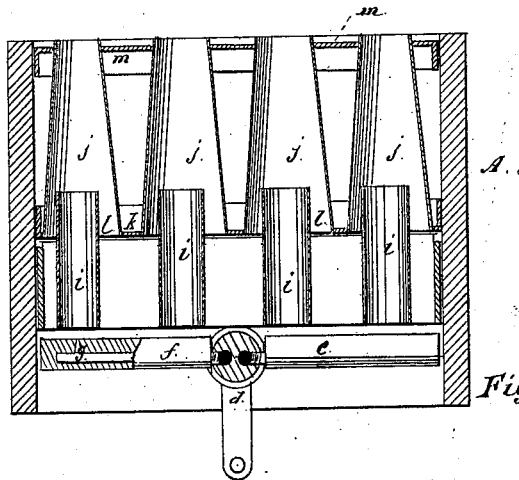


Fig. 3.

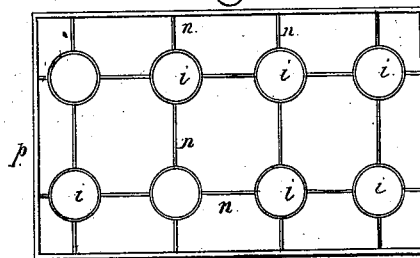


Fig. 5.

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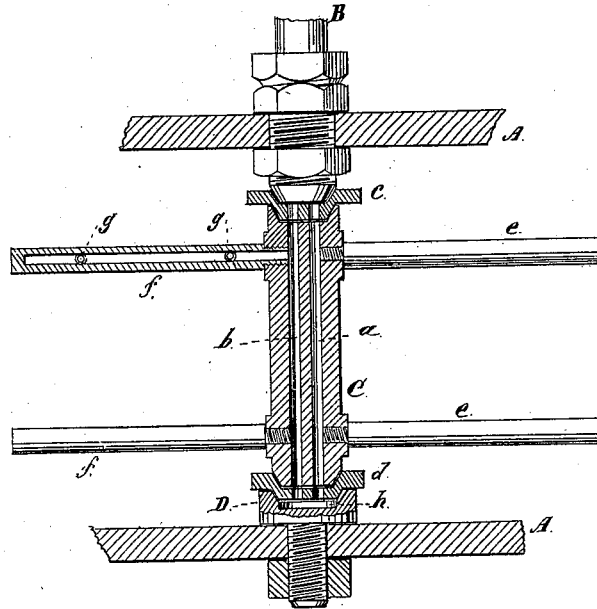


Fig. 6.

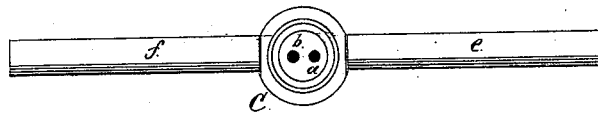


Fig. 7.

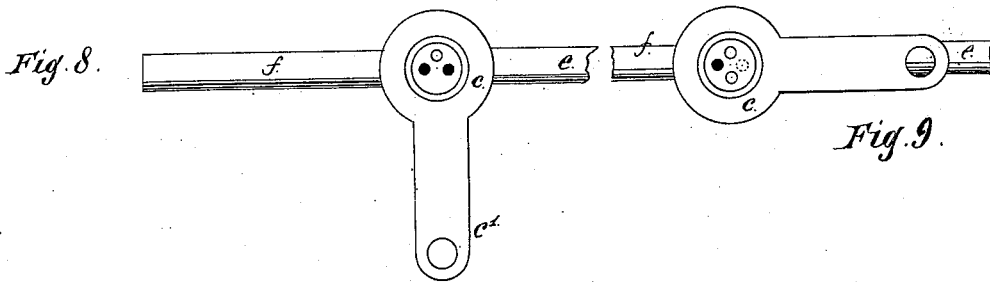


Fig. 8.

Fig. 9.

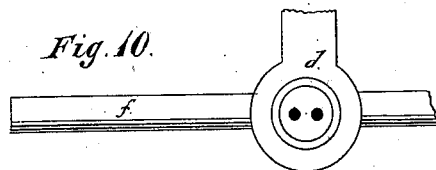


Fig. 10.

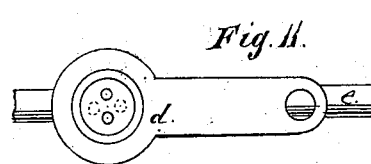


Fig. 11.

Witnesses:

*Wm. F. Brown*  
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# UNITED STATES PATENT OFFICE.

EVAN J. JONES, OF INDIANAPOLIS, INDIANA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE EUREKA BLAST COMPANY.

## IMPROVEMENT IN DEVICES FOR SUPPLYING STEAM AND AIR BLAST TO FURNACES.

Specification forming part of Letters Patent No. **200,310**, dated February 12, 1878; application filed May 26, 1877.

To all whom it may concern:

Be it known that I, EVAN J. JONES, of the city of Indianapolis, Marion county, State of Indiana, have invented new and useful Improvements in Devices for Supplying Steam and Air Blast to Furnaces, of which the following is a full description, reference being had to the accompanying drawings, consisting of two sheets, in which—

Figure 1 is a side elevation; Fig. 2, a front elevation; Fig. 3, a horizontal section taken at *x* of Fig. 2; Fig. 4, a top or plan view, showing the arrangement of the tubes *i j* and plates *k m*, the same being removed from the case A; Fig. 5, a front elevation of the mouth of the tubes *i* only; Fig. 6, a section showing the arrangement of the steam-passages; Figs. 7, 8, 9, 10, and 11, details.

This invention is an improvement upon devices for which a patent has been recently allowed me. In that device the steam entered into an open chamber in the side of the ash-pit. With a light fire and a light body of coal on the grate, this device works well; but with a heavy fire and a large body of coal on the grate, sufficient pressure cannot be produced to force the steam and air through the same, because they are forced out through the open passage in the wall.

The chief object of this invention is to overcome this difficulty, which I accomplish by the use of a series of tubes, through which the steam and air are forced, the space between the tubes being closed by a plate.

My invention further consists in the peculiar arrangement of the steam-passages and devices for controlling the flow of steam through the same.

In the drawings, A represents the case in which my devices are located, which case may be set in the walls of the furnace, beneath the grate, opening into the ash-pit.

B is the tube through which steam is brought from the boiler, in the usual manner.

C is located in the case A by suitable connections at the top and bottom, and is provided with two steam-passages, *a b*. This part C may be regarded as a continuation of the steam-pipe B. Its upper end is recessed, and the cut-off *c* has upon its under side a boss fitting into such recess. The lower end

of C fits into a recess in the cut-off *d*, and the under side of this cut-off fits into a recess in the support D, in which there is a chamber, *h*, below the cut-off *d*.

*c* is a cut-off, operated by a handle, *c'*, connected therewith. It is provided with three holes, two of which, when *c* is in the position represented in Fig. 8, are directly over the two passages *a b* in C. By turning this part *c* to the right or left, communication with one or the other of the passages *a b* can be cut off, and all steam which passes through C will then pass through one of the said passages *a* or *b*.

*d* is another cut-off, located at the bottom of C. It is provided with two holes, corresponding with the passages *a b*. Beneath *d* is a small chamber, *h*, into which steam can pass.

*e* are arms, closed at the ends, but having a steam-passage therein, which communicates with the passage *a* in C.

*f* are corresponding arms, communicating with the passage *b*. Each arm *e f* is provided with a suitable number of openings, *g*, for outlets for the steam.

*i* are tubes located within the case, in front of the openings *g*, into which tubes *i* steam-jets pass.

*j* is another series of tubes, somewhat larger than *i* at one end, into which the inner ends of *i* pass. These tubes *j*, as represented, are tapering, but may be straight.

*k* is a plate, which closes the spaces between the tubes *j* at one end.

*m* is another plate, located at or near the inner ends of the tubes *j*, filling all the space between the tubes, and between the tubes and the case A.

*n*, Fig. 5, are supports for the tubes, and *p* a band, with which the outer supports *n* are connected. These parts *n* also form partitions between the tubes *i*, thus forming chambers, which aid in preventing eddy currents, which interfere with the entry of air into the tubes.

In operation, the steam from the jets *g* is forced into the tubes *i*, and a quantity of air will be carried along with the steam into the tubes *j*, and thence into the ash-pit, and at the same time, if the force of the steam is sufficient for the purpose, an additional quan-

tity of air will be carried through *l*, which is simply a space around the tubes *i*, and into the ash-pit. The plate *m* entirely closes the chamber *A* at its inner end, except the openings at the inner ends of the tubes *j*, and by the use of this plate *m* a much greater pressure can be produced within the ash-pit than without it, thereby forcing a current of air through a large body of coal upon the grate, which cannot be done without this plate *m* is used, because, as before stated, when the passage in which the steam-jets are placed is entirely open, after the pressure in the ash-pit reaches a given point, the steam and air return through such chamber. It is evident that if the doors of the ash-pit be thrown open, little or no pressure can be obtained in the ash-pit by injecting steam therein. So, if the case *A* be entirely open, the pressure in the ash-pit cannot be so great as when the steam and air are more perfectly confined by means of the plate *m*.

When steam is permitted to enter both chambers *a b*, one-half will pass to the arms *e* and the other to the arms *f*. This will be done when the cut-off *c* is in the position represented in Fig. 8, without regard to the position of the cut-off *d*; but if *c* be turned to the position represented in Fig. 9, and *d* be in the position represented in Fig. 10, then steam can only pass into the chamber *b*, and, of course, a less quantity of steam will pass; but then this steam will pass down the passage *b*, a portion passing out into the arms *f*, and a portion will enter the small chamber *h* below *d*, thence up the passage *a* into the arms *e*, so that when there is but a little pressure of steam, and not sufficient to properly force it through both chambers *a b*, it can be cut off upon one side, and at the same time be equally distributed through the arms *e f* upon both sides of *C*; but if *d* be turned into the position represented in Fig. 11, and *c* be in the position represented in Fig. 9, then steam can pass only to the arms upon one side of *C*, the communication from the passages *a b* to the chamber *h* being cut off by *d*.

Nipples may be used upon the arms *e f*, if desired.

I have shown two series of tubes, *i j'*; but a single series may be used successfully. When there is a great pressure of steam, more than two sets of tubes may be used; but in all cases a plate corresponding to the plate *m* must be provided. It may be located near the inner ends of the inner tubes, or it may be elsewhere. Its location is not essential.

When two or more sets of tubes are used they may be adjusted relative to each other, and the distance of the first set from the arms *e f* can be adjusted as occasion may require.

When steam is cut off from the arms upon one side, it will be desirable to provide a suitable device for closing the tubes upon that side.

I have described my improvement as applied in the wall of the ash-pit of a furnace; but a blast may be used with a cupola-furnace and in other places by the use of my invention. *C* may have a single central passage for the steam, instead of two passages, in which case the cut-offs will be omitted.

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

1. A series of tubes arranged in the ash-pit wall of a furnace, and provided with a plate to fill the spaces around the tubes, substantially as and for the purposes set forth.

2. The tubes *i* and plate *k*, and a plate, *m*, arranged in the wall of a furnace, in combination with devices for introducing steam into the tube, all substantially as and for the purposes set forth.

3. The steam-pipe *C*, provided with two passages, *a b*, and arms *e f*, in combination with cut-offs *c d*, all constructed substantially as and for the purposes set forth.

4. In an apparatus for introducing steam to furnaces, the combination of the tubes *i* and partitions *n*, the latter forming chambers around the tubes for the purpose of breaking up or preventing eddying currents, substantially as set forth.

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Witnesses:

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E. A. WEST.