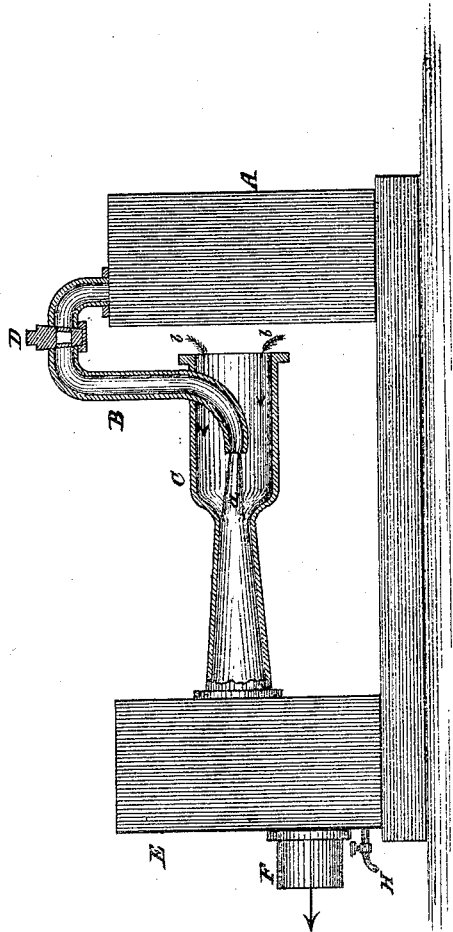


P. W. MACKENZIE.

Improvement in Blast by Steam-Jet for Furnaces, &c.

No. 114,163.

Patented April 25, 1871.



Witnesses.
Chas. M. Webb
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PHILIP W. MACKENZIE, OF BLAUVELTVILLE, NEW YORK.

Letters Patent No. 114,163, dated April 25, 1871.

IMPROVEMENT IN BLASTS BY STEAM-JETS FOR FURNACES, &c.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, PHILIP W. MACKENZIE, of Blauveltville, in the county of Rockland and State of New York, have invented a new and improved Jet or Current-Blower; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing forming a part of this specification and to the letters of reference marked thereon.

My invention relates to improvements in blowers for cupola, smelting, and similar furnaces, as well as for other purposes, and its object is to produce a stronger blast, thereby producing a much more intense heat, at a smaller expense, than has hitherto been attained by any means employed for the purpose.

The nature of my invention consists in the combination of a jet or current-blowing apparatus with a condensing apparatus, by which combination and the employment of a boiler in which steam, gas, or other desired vapor is formed or generated, which, together with the action of the atmosphere, produces a most powerful blast at a much less expense than has hitherto been obtained.

The conducting-tube being coned or trumpet-shaped, so that the line of the expanding current will be parallel with the sides of the inner wall of the tube, thereby causing a strong impinging current at the contracted part of the tube, and allowing it to have its natural expanding course, and also compelling the surrounding air between the exit of the jet and the throat to also impinge upon and mingle with the current of steam, thus giving the greatest volume of air with the least expenditure of steam. This result has been obtained by long and expensive experiments with different angles of the line of axis. These angles must vary, and also the distance of the jet from the throat, according to the pressure required. I have made tests in comparison with very perfectly-constructed blowing machinery, and have found that, for a pressure up to one pound to the square inch, and possibly above, it will produce fully as economical results.

I am aware and am familiar with the use of jet-steam in a plain cylindrical tube, but the quantity of steam required condemns it for two obvious reasons: First, the great draught upon the boiler; second, the great amount of steam to be condensed.

The condenser may be of the well-known kinds. Its object is to remove the steam or vapor, also to impart a certain percentum of the heat back into the generator.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The figure represents a side elevation of my improved blower, with the current-tube and steam-pipe shown in section.

A may represent the boiler or generator in which steam, gas, or vapor is generated, which may be made of suitable form and materials, and of such dimensions and strength as may be requisite for the amount and pressure required.

B is the pipe for conducting the steam, gas, or vapor from the generator into the current-generating tube C.

The lower end of the said pipe B, which passes within the tube C, may be provided with a suitable nozzle for producing a jet, *a*, of such volume as may be desired.

This pipe B is provided with a throttle-valve or stop-cock, D, for the purpose of regulating the supply of steam, gas, or other vapor from the generator to the generating-tube C.

The tube C is open at one end, and connected at the other end with a condenser, E.

The jet *a*, being introduced into the tube C, forms a partial vacuum, which causes a rapid current to rush into the same in the direction of the arrows *b b*, and the combined products pass from thence into the condenser E, where the condensable vapor is soon condensed to any required extent; and the air is conveyed by the blast-pipe F to the place or point where it is required for use, while the steam or other obnoxious vapors, having been condensed, pass off by the waste-pipe H, and the heat produced by the condensed vapor may be utilized in the boiler or generator A.

This condenser E may be made of sheet metal or boiler iron of sufficient strength to stand the required pressure, and of any suitable or desired form and dimensions; but I generally construct the condensers I use in connection with my blower in the cheapest and most simple manner, being simply a square box or in the form of a cube. Its form may, however, be varied without materially affecting the result of my invention. The connections of the induction and eduction-tubes or pipes are made in the ordinary way.

The pipe or tube C is of peculiar form, and is required so to be in order to produce the desired results. The outer end is somewhat bell-shaped, and of larger diameter than the other portions for the purpose of admitting a greater amount of air or gases, and, as it approaches the condenser, is made smaller in such a manner as to form an ogee curve, at which point the volumes are contracted, and from which point the pipe expands, diverging in a straight line, as near as may be in the line that the jet or current would naturally expand after leaving the nozzle of

the pipe B, by which means the gases and vapor are forced into the condenser.

It may be observed that by this means a very powerful blast or current is produced.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent of the United States, is—

The gas or vapor-generating apparatus A, in combination with the condenser E, when so connected or

combined as to produce a current or jet from the generator A, which jet or current is formed by the combined action of steam, gas, or other vapor with atmospheric air, as herein shown and described.

PHILIP W. MACKENZIE.

Witnesses:

CHAS. W. ISBELL,

C. ROGERS.