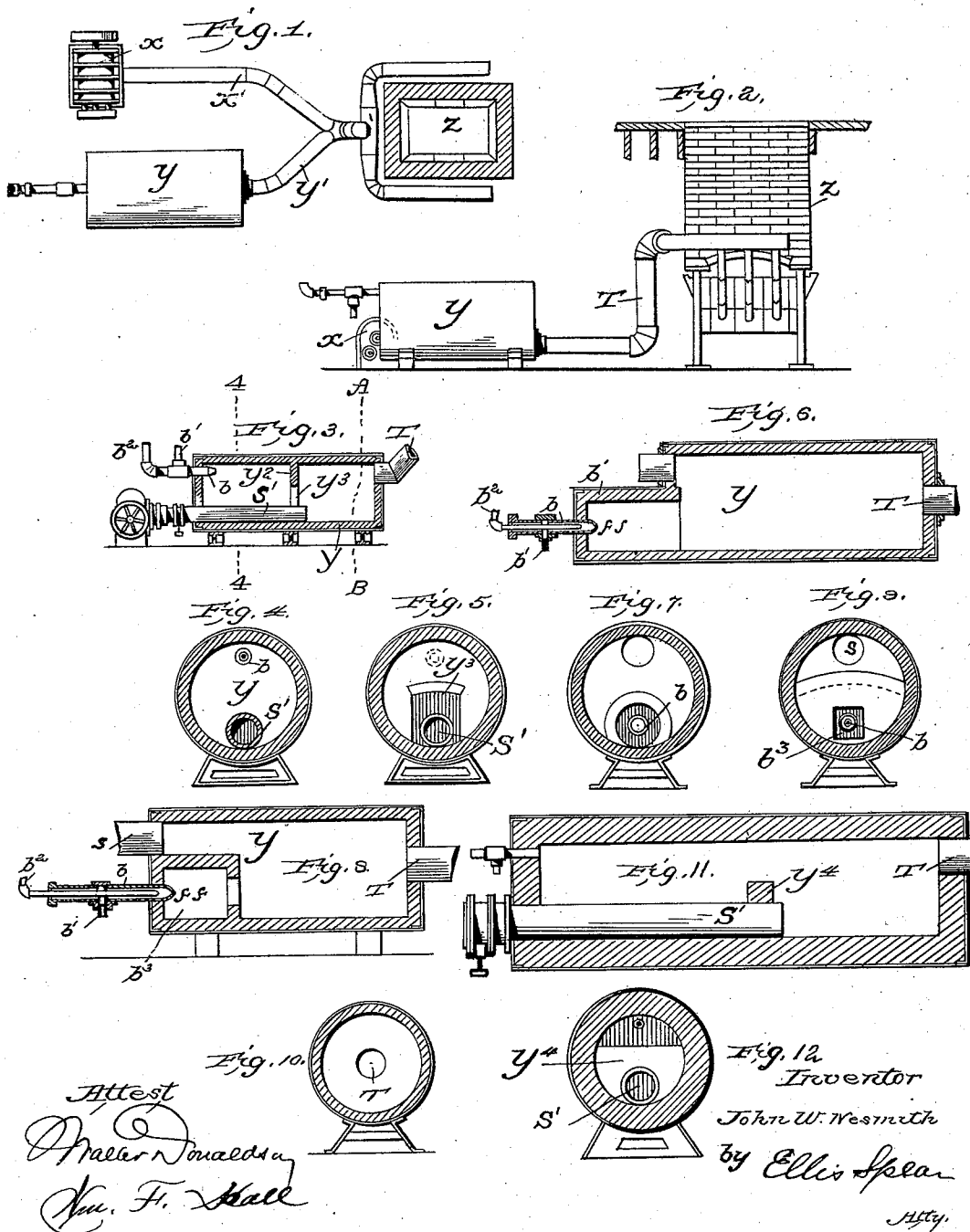


(No Model.)

J. W. NESMITH.
BLAST APPARATUS FOR FURNACES.

No. 575,974.

Patented Jan. 26, 1897.



UNITED STATES PATENT OFFICE.

JOHN W. NESMITH, OF DENVER, COLORADO, ASSIGNOR TO THE COLORADO
IRON WORKS COMPANY, OF SAME PLACE.

BLAST APPARATUS FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 575,974, dated January 26, 1897.

Application filed April 9, 1896. Serial No. 586,886. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. NESMITH, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Blast Apparatus for Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

My present invention relates to the form of hot-blast apparatus for furnaces disclosed in United States Patent granted me March 3, 1896, No. 555,731, in which a blast of air is forced through a stove or intermediate chamber, into which the hot blast is also forced under a pressure greater than that of the air-blast.

I have found through extended experiments that the best results are secured when the fire in the stove is protected from the air-blast which would otherwise have an abrading or rasping effect on the fire at the burner, resulting in imperfect burning of the gaseous or vaporized oil fuel. This is due to the fact that the fuel would be carried away if exposed directly to said abrading action of the blast and would be cooled to such an extent as to escape without being consumed at the burner.

In the accompanying drawings I have shown various ways of protecting the fire in the stove from the direct abrading action of the air-blast, and it will be seen from the numerous ways in which my invention may be carried into effect that I do not wish to limit myself to any particular way of securing the desired protection of the fire.

Figure 1 is a plan view of one form of my invention in which the air-blast does not enter the stove direct. Fig. 2 is a side view of Fig. 1. Fig. 3 is a detail sectional view of a modified form of stove. Fig. 4 is a sectional view on line 4 4 of Fig. 3, looking toward the left. Fig. 5 is a sectional view on line A B of Fig. 3, looking toward the left. Fig. 6 is a view of a modification. Fig. 7 shows a cross-sectional view of the stove of Fig. 6. Fig. 8 is a sectional view of another form of the stove. Figs. 9 and 10 are cross-sectional views of the stove of Fig. 8. Fig. 11 is an enlarged sectional view of still another form

of my invention. Fig. 12 is a cross-sectional view of the stove of Fig. 11.

Referring to the Figs. 1 and 2, the fire is burning in the stove Y by means of the burner *f*, as in my former patent. This stove is connected by a pipe Y' with another pipe X', which comes from the air-blower X, the two pipes joining near the furnace at the bustle-pipe. The desired object will be accomplished by this arrangement. That is to say, there is no direct action of the air current or blast upon the fire burning in Y, but still the heat passes out through the pipe Y' and joins with the blast from X where the pipes X' and Y' join together. There is no tendency whatever for the air-blast to effect the proper burning of the fuel at the burner and the fire is maintained at its maximum effectiveness and no fuel is wasted.

In the form of apparatus shown in Figs. 3, 4, and 5 the pipe S from the blower passes into the stove and is extended on past the middle thereof, as at S'. As shown at Y², a partial wall divides the stove Y into two compartments, but this wall does not close the space tightly, an opening Y³ being left about the inner end of the air-pipe S', and the blast passing from the blower X along through pipe S' is discharged into that part of the chamber to the right of the division, while the blast and fuel, passing in through the pipe *b*, causes the fire to burn in that compartment, and the pressure of the blower which feeds this open fire, as described in my patent referred to, being greater than the air-blast, there is a current gradually flowing through the open part of the division in the stove and complete combustion takes place on the left-hand side of the division at the end of the pipe *b*, and this current flows out and joins with the cold air delivered from the blower through the pipe S, with its continuation S', thence the hot blast and air pass to the furnace through the pipe T. It will be seen that there is a clear open space between these two compartments, so that the fire is burning in the atmosphere of the blast, but all abrading action placed on the open fire by the air-blast is avoided by said air-blast passing through the pipe S' on past where the fire is burning. The heat and products of combustion of the open

fire pass on and mix with the cold air in the chamber at the right of the main pipe S'.

In Figs. 6 and 7 another plan is shown, consisting of an extension *b'* made to the stove beyond the point of entrance of the air-blast pipe S, and the pipe *b* enters into this extension at the end thereof. The fire burns at *f* while the air-blast is carried into the chamber above and to the right of the burner and its chamber.

In Figs. 8, 9, and 10 another form is shown in which the burner-chamber, instead of being an extension of the stove, is made by simply an arch thrown over the fire to protect it from the abrading action of the cold blast from the blower X entering through the pipe S'.

Figs. 11 and 12 show an arrangement of the stove wherein the brick partition Y⁴, near the end of the pipe S', extends a little more than half-way up across the stove, the action here being substantially the same as that in Figs. 3 and 4. The pipe S' if used alone will effect the desired result in carrying the air-blast beyond the fire.

It will be noticed that in one form of my invention the air-blast pipe itself extends into the stove to a point beyond the outlet of the burner. In another form the air-blast pipe, as in Fig. 1, extends beyond the burner-outlet, but not into the stove, while in still another form, as in Fig. 8, the pipe terminates at the stove but connects with a conduit-space which conveys the air to a point beyond the burner-outlet, this conduit-space being formed by the projecting arch.

I claim—

1. In combination, the blast-furnace, a stove comprising a heating-chamber and a burner therein, an air-blast conduit extending beyond the burner-outlet and arranged to carry the air-blast beyond the flame in the chamber, a connection between the stove and furnace and means for applying to the burner

a greater pressure than to the air-blast, substantially as described.

2. In combination, the blast-furnace, a stove comprising a heating-chamber and a burner therein, an air-blast conduit extending beyond the burner-outlet and arranged to carry the air-blast beyond the flame in the chamber, and a connection between the stove and furnace, the said burner and air-blast having independent sources of supply, substantially as described.

3. In combination, the blast-furnace, a stove comprising a heating-chamber with a burner-pipe terminating therein, an air-conduit extending beyond the burner-outlet and arranged to carry the air-blast to a point beyond the flame before commingling and a connection between the stove and the furnace.

4. In combination, with a blast-furnace, the stove comprising a heating-chamber with a burner-pipe terminating therein, an air-blast conduit leading into the stove and extending beyond the burner-outlet to carry the air-blast, to a point beyond the flame before commingling with the same, means for protecting the flame in the stove from the said air-blast, and a connection between the stove and furnace, substantially as described.

5. In combination, the blast-furnace, a stove comprising a heating-chamber with burner-pipe terminating therein, an air-blast pipe arranged to carry the air-blast to a point beyond the flame in the stove and a connection between the stove and furnace, the said pipes being arranged to direct their blasts parallel with each other at the point of commingling, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN W. NESMITH.

Witnesses:

E. E. GOODALE,
F. D. GROSS.