

No. 879,302.

J. W. NESMITH.

PATENTED FEB. 18, 1908.

BLAST HEATING APPARATUS.

APPLICATION FILED APR. 3, 1905.

2 SHEETS—SHEET 1.

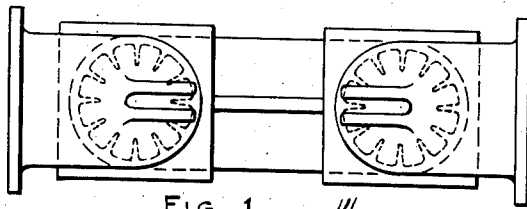
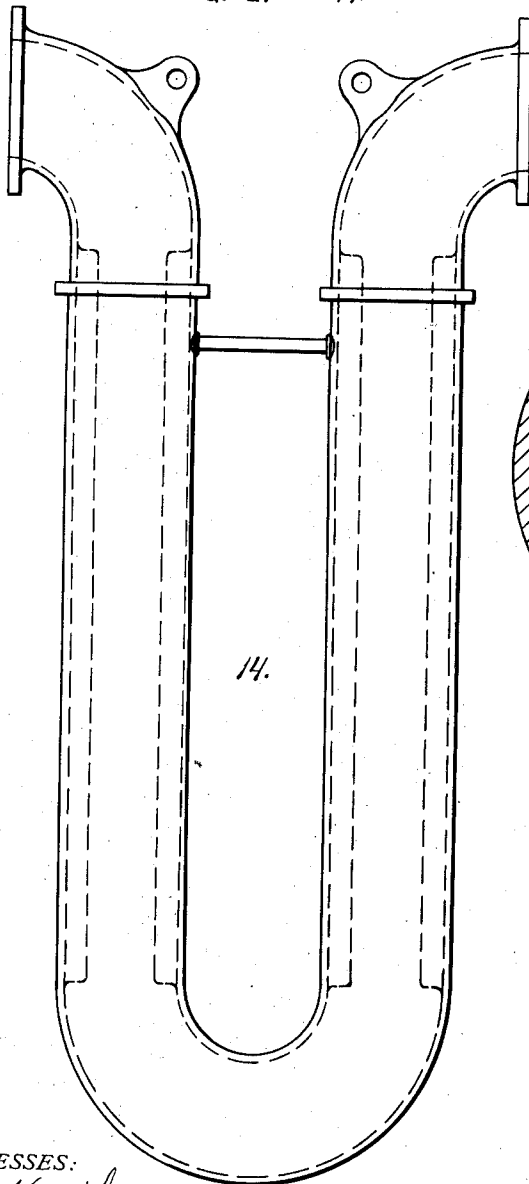
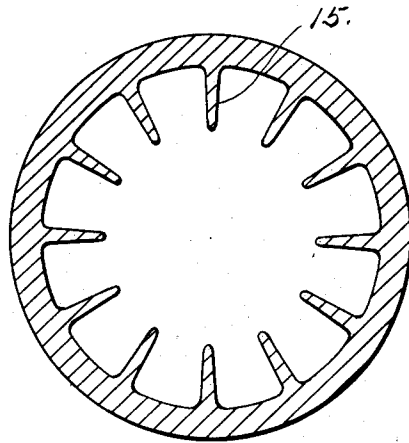


FIG. 1. 14.



14.

FIG. 2.



15.

FIG. 3.

WITNESSES:

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Dena Nelson.

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2 SHEETS—SHEET 2.

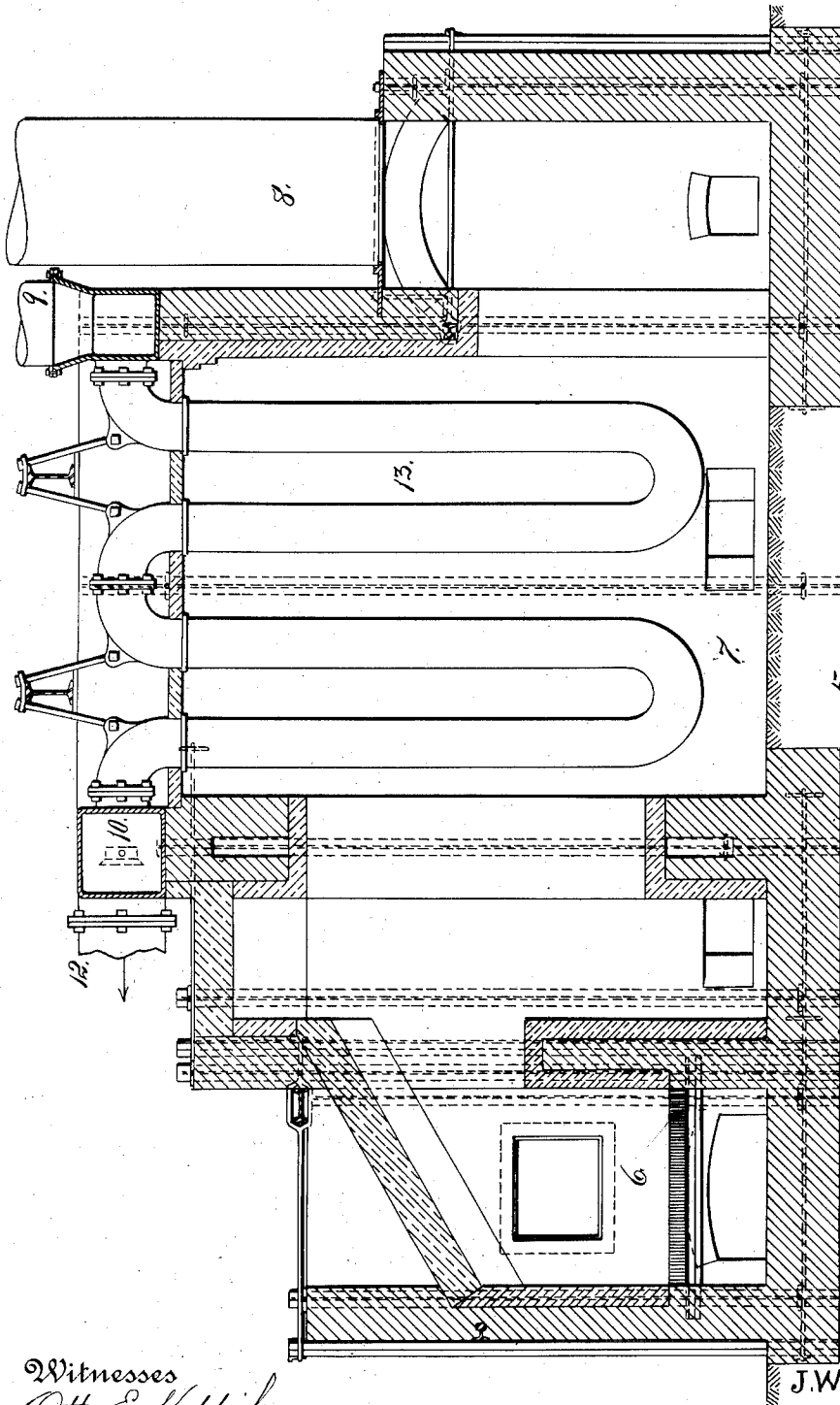


Fig. 4.

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UNITED STATES PATENT OFFICE.

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BLAST-HEATING APPARATUS.

No. 879,302.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed April 3, 1905. Serial No. 253,612.

To all whom it may concern:

Be it known that I, JOHN W. NESMITH, a citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Blast-Heating Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in apparatus for heating an air blast preparatory to its delivery to the furnace as a blast furnace where it is to be employed. It is well known that it is desirable to heat the air blast in furnaces of this character, that is to say where a high degree of heat is required in order to melt or fuse the ore or other material in the furnace.

Heretofore so far as I am aware, conduits composed of U-pipe members, located in a stove or heating chamber, have been employed the said conduits having plain interior surfaces. As these conduits are of considerable size, it has been found impossible to properly heat the entire volume of air passing therethrough, since while the air immediately adjacent the wall of the conduit is properly heated, the air occupying the central part of the conduit remains comparatively cool.

The object of my present invention is to overcome this difficulty and to this end, instead of making the inner walls of the conduits smooth, I provide the same with interiorly-projecting beads or plates preferably radially disposed whereby the heating surface or area with which the blast comes in contact, is greatly increased. These radial plates or beads, may be of any desired width.

Having briefly outlined my improved construction as well as the function it is intended to perform, I will proceed to describe the same in detail reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a top plan view of a U-shaped member of the blast heating conduit, provided with my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a cross section taken through one of the

members shown on a larger scale. Fig. 4 is a section taken through the blast heating apparatus showing the conduit composed of the U-shaped members in elevation.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the ordinary blast heating apparatus composed of a fire box 6, a heating chamber 7, a stack 8, a blast inlet 9, a conduit 10 and an outlet 12 for the hot blast. This mechanism is of ordinary construction. Within the chamber 7 is the blast conduit 13 composed of the U-shaped members 14 shown in Figs. 1 and 2. One end of this conduit 13 communicates with the blast inlet 9, while its opposite extremity communicates with the hot blast conduit 10. As shown in the drawing the conduit is composed of but two U-shaped members. Ordinarily these blast heating conduits are of considerable length. The construction shown in the drawing, however, is sufficient to answer the purposes of my present invention. Usually a number of conduits are arranged side by side within the heating chamber. This feature, however, is not material so far as my present purposes are concerned.

As heretofore outlined the feature of my invention which distinguishes it from air blast conduits of ordinary construction, is the interiorly-projecting radial plates or beads 15 which as shown in the drawing are formed integral with the straight or vertical parallel portions of each U-shaped member. As shown in the drawing there is a considerable number of these radial plates. The exact number, however, is not material except that within certain limits, the greater the number of plates, the greater advantage, since the greater will be the heating surface or area with which the air comes in contact as it passes through the blast conduit. It is evident, however, that it would not be advisable to put these plates so close together, as to obstruct the conduit to a considerable degree, since a too close arrangement would have a tendency to diminish the volume of the blast. The number of plates indicated in Fig. 3 of the drawing, is believed about right under ordinary circumstances though of course the invention is not limited to any precise number of these plates.

In the use of a blast heating apparatus of this character, attention is called to the fact that the blast is introduced to the conduit 13

at the extremity thereof remote from the fire
box and discharged into the conduit 10 at
the extremity nearer the fire box. By virtue
of this arrangement the blast is caused to
5 travel in a direction opposite the travel of
the hot gases or products of combustion
through the heating chamber. The object
of this is, to utilize to the fullest extent possi-
ble the heat from the fire box, and this effi-
10 ciency is best obtained by causing the air to
travel from the coldest to the hottest part of
the heating chamber, whereby the tempera-
ture to which the air is subjected, is continu-
ally rising thus maintaining a constant differ-
15 ential of considerable magnitude between the
blast and the temperature of the chamber.

Having thus described my invention, what
I claim is:

A blast heating conduit composed of U-
shaped members, the parallel portions of 20
each U-shaped member being provided with
radially disposed ribs projecting into the in-
terior only thereof, and the curved portions
having both the exterior and interior sur-
faces thereof smooth. 25

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

JOHN W. NESMITH.

Witnesses:

R. E. GIBBS,
C. O'B. BERRY.