

(No Model.)

2 Sheets—Sheet 1.

F. J. FALDING.
MUFFLED FURNACE.

No. 539,729.

Patented May 21, 1895.

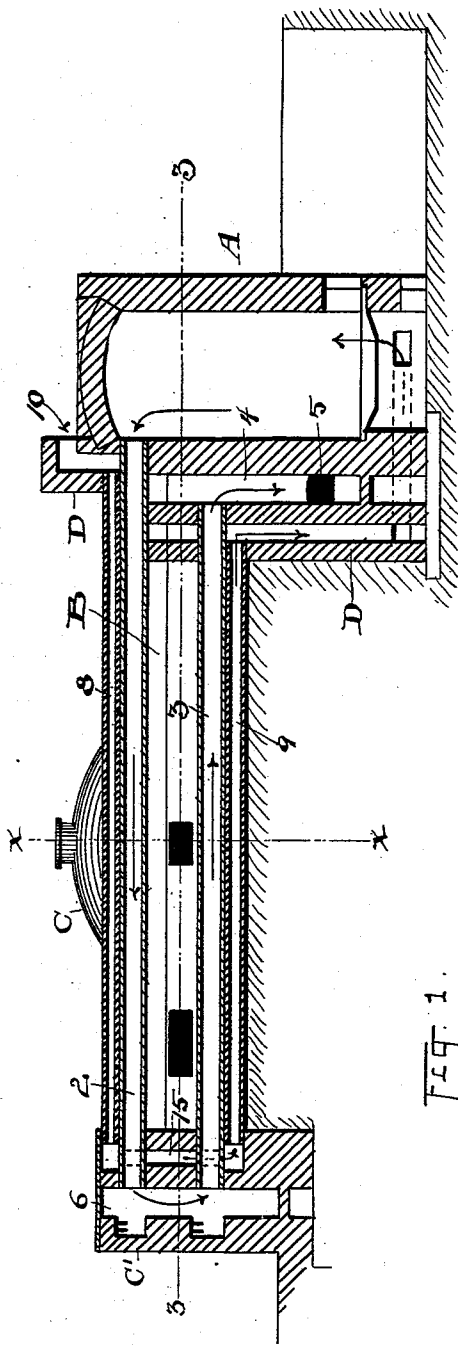


Fig. 1.

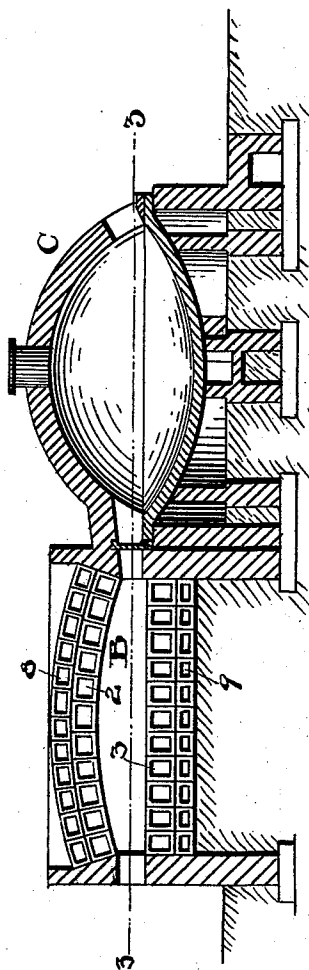


Fig. 2.

ATTEST.

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G. L. Schaeffer

INVENTOR.

Fredrick John Falding

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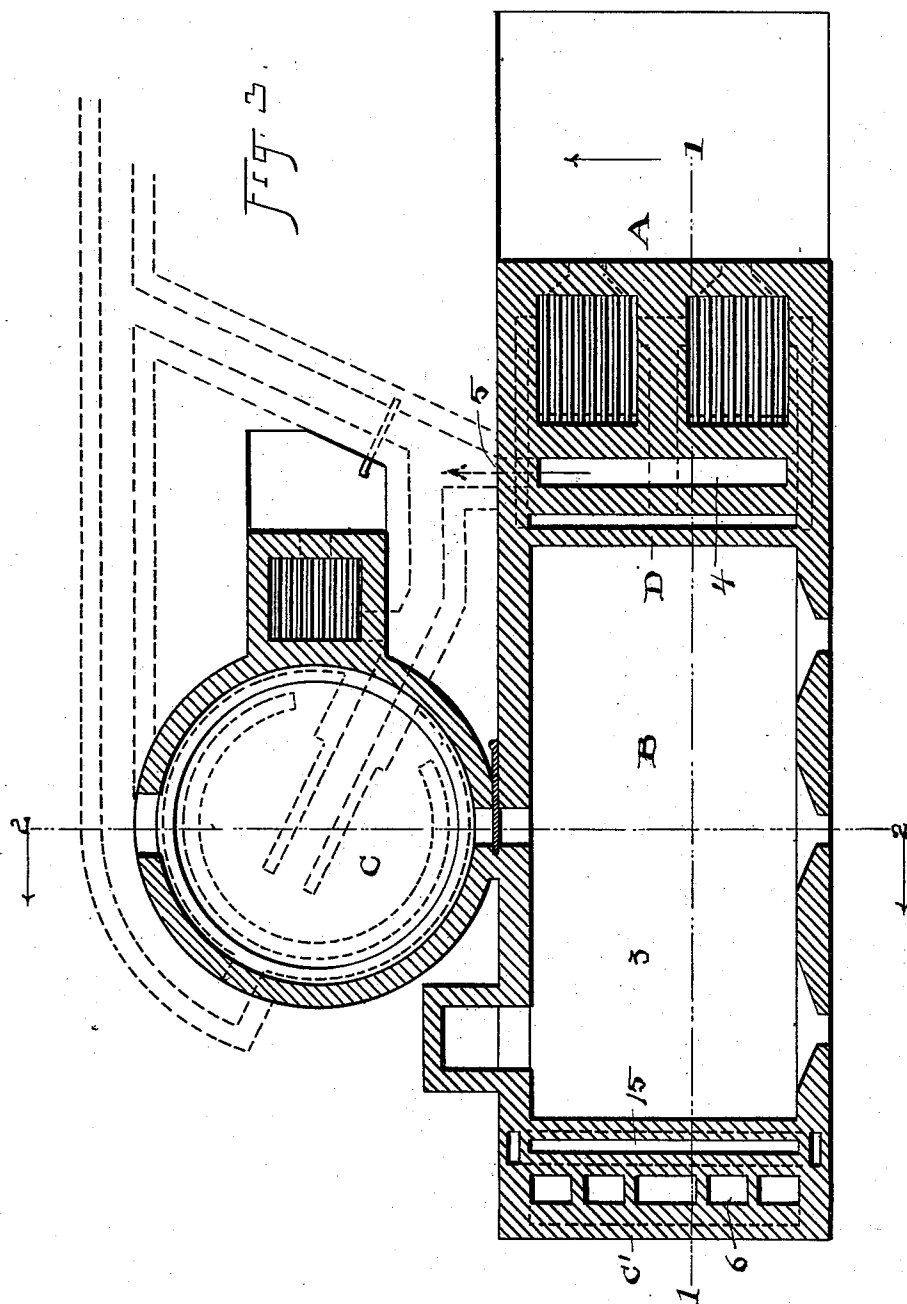
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UNITED STATES PATENT OFFICE.

FREDERIC JOHN FALDING, OF CLEVELAND, OHIO.

MUFFLED FURNACE.

SPECIFICATION forming part of Letters Patent No. 539,729, dated May 21, 1895.

Application filed August 7, 1894. Serial No. 519,670. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC JOHN FALDING, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Muffled Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to muffled furnaces, and the invention consists in the construction of a muffle, the method of conducting the furnace gases around the muffle and to economize and utilize the heat radiated from the muffle to heat the furnace, by heating the air which goes to the furnace to support combustion, thereby saving the heat which would otherwise escape or be carried away by radiation, all substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings, forming a part of the specification, Figure 1 is a longitudinal sectional elevation of a furnace constructed with my improvements and taken on a line corresponding to 1 1, Fig. 3. Fig. 2 is a cross-section on a line corresponding to lines *x x*, Fig. 1, and 2 2, Fig. 3. Fig. 3 is a horizontal section on a line corresponding to line 3 3, Figs. 1 and 2.

In the drawings an application of the muffle in a sulphate of soda furnace is shown, and A represents the furnace proper, B the muffle, and C the usual pot at the side of the muffle.

I lay no claim to novelty in the construction or arrangement of the pot in respect to the muffle, nor in the muffle itself in connection with or in its relation to the pot, but I do claim the muffle when modified and constructed as shown and described herein.

In all cases, so far as I am aware, muffled furnaces heretofore have been of an ordinary plain construction in so far as the top, bottom and sides were concerned, and there was no provision in them whereby the heat which was radiated therefrom was utilized for any purpose whatsoever. It followed therefore that there was an excessive and wasteful loss of heat because muffles necessarily require a very high temperature to do their work. I

have therefore improved the construction of the muffle so that the radiated heat at both its top and bottom is economized and saved and used over again through the furnace for heating the muffle, as herein described. In this improved construction I employ a series of flues or tiles —2— arranged side by side over the muffle the full width and length thereof and opening at one end into the top of the furnace and at the other end into the rear wall C', thereby forming the body of the muffle. Along the bottom of the muffle and forming the bottom thereof is another series of flues or tiles —3—, or their equivalent, running also the full length of the muffle and at their inner ends and near the furnace discharging into an open down passage or chamber —4— in the back wall of the furnace A and thence to the flue opening —5— which leads to the chimney or smoke stack.

The rear wall C' of the muffle is formed with an internal passage —6— which connects the two sets of flues —2— and —3—, and so it occurs that the heat and products of combustion enter the flues —2— from the top of the furnace A and, passing thence over the top of the muffle B, enter the rear vertical passage or channel —6—, from which they take the return flues —3— along the bottom of the muffle and pass thence into the discharge passage and flues —4— and —5— at the immediate rear of the furnace A. Now, to preserve and utilize the heat, which obviously would be radiated from these top and bottom flues, I have constructed the walls of the furnace and muffle to adapt them to receive top and bottom air flues —8— and —9—. The top air flues —8— are built into the rear wall D of the furnace A and communicate with an inlet passage —10— at the top thereof. The bottom air flues —9— are laid along immediately beneath the bottom heat conveying flues —3— and discharge into the down passage having an outlet near the front of the furnace from the wall thereof beneath the fire grate. The rear wall C' of the muffle has a down passage —15— connecting the top air flues —8— with the bottom air flues —9—. Both sets of air flues —8— and —9— cover the entire width of the muffle and of the top and bottom flues —2— and —3—, respectively, so that any heat that is radiated

from said flues —2— and —3— unavoidably
passes into the flues —8— and —9—. It thus
occurs that whatever radiation of heat takes
place from the flues —2— and —3— up or
5 down must enter the air conveying flues —8—
and —9— and the air in said flues being
heated is carried to the furnace in a heated
state, adding just that much to the heat of
the furnace and besides promoting better
10 combustion altogether and getting more heat
out of the same quantity of coal than could
be obtained if cold air were used instead.

What I claim is—

1. A muffle furnace consisting of a series of
15 parallel tile heating-flues laid side by side
and forming the top and bottom of the muffle
respectively, and air flues for the furnace ex-
tending over the top and along immediately
beneath the bottom of said heating flues, and
20 the rear wall of the muffle provided with a
connecting passage for each set of flues, sub-
stantially as set forth.

2. In a muffle furnace, a heat passage from
the top of the furnace and a parallel return

passage beneath the muffle, a rear wall hav- 25
ing a passage connecting said passages, a se-
ries of parallel tubes extending full length
over the said heat passage and along beneath
the return passage and a connecting passage
at their rear, substantially as set forth. 30

3. The furnace having the outgoing heat
passage formed by a series of parallel earthen
tubes —2— and a corresponding series of re-
turn tubes —3— beneath and the chamber 35
between said sets of tubes and the rear wall
having a common passage from one set of
tubes to the other, in combination with the par-
allel air tubes —8— and —9— arranged over
and under the said heat passages respectively,
and the said tubes having a discharge into 40
the furnace, substantially as set forth.

Witness my hand to the foregoing specifi-
cation this 5th day of July, 1894.

FREDERIC JOHN FALDING.

Witnesses:

H. A. FRANK,

J. H. C. MCQUILKEN.