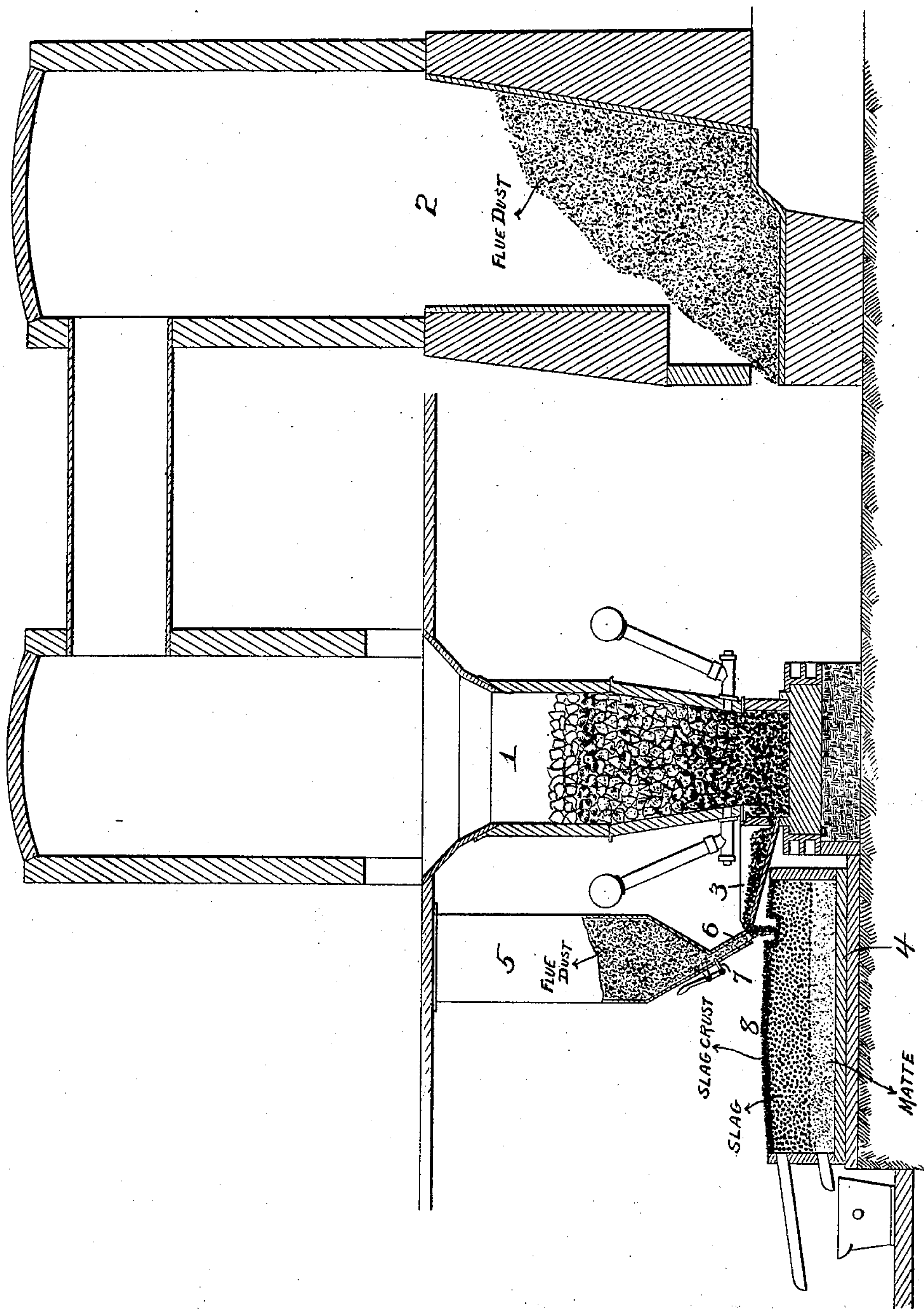


No. 897,993.

PATENTED SEPT. 8, 1908.

A. R. McKENZIE.
SMELTING.

APPLICATION FILED DEC. 5, 1907.



WITNESSES

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ALEXANDER R. McKENZIE, OF GREAT FALLS, MONTANA.

SMELTING.

No. 897,993.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed December 5, 1907. Serial No. 405,221.

To all whom it may concern:

Be it known that I, ALEXANDER R. McKENZIE, of Great Falls, in the county of Cascade and State of Montana, have invented
5 certain new and useful Improvements in Smelting; and I do hereby 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
10 make and use the same.

My invention relates to improvements in smelting and more particularly to the smelting of comminuted ore, such for example as flue dust,—one object of the invention being
15 to avoid the molding of fine ore or flue dust into the form of briquets and the expense incident thereto.

A further object is to utilize the heat of the slag and matte as it passes from a blast furnace to a settling tank, in the smelting of
20 fine ore, such as flue dust.

With these objects in view the invention consists in certain novel steps in a smelting process as hereinafter set forth and pointed
25 out in the claims.

The accompanying drawing is a view in section illustrating one embodiment of an apparatus with which my improved process may be carried into effect.

30 While various forms of mechanical devices might be utilized in effecting the steps of the process, I have found that an apparatus, such as illustrated in the drawing, will subserve the purposes of my invention. This
35 apparatus I will now describe in detail.

1 represents a blast furnace which may be of any preferred form of construction and provided with the various appurtenances necessary for the operation of the furnace in
40 smelting ore. The apparatus may also be provided with a chamber 2 communicating with the flues for containing accumulations of flue dust. The bottom of the furnace is provided with a spout 3, by means of which the
45 slag and matte will be discharged into a suitable settler or settling tank 4,—the matte which settles in the bottom of this tank being drawn off in the usual manner. Provision is also made for the drawing off of the slag.

50 In accordance with my invention, the finely divided ore or flue dust is fed to the stream of slag and matte as the latter flows from the spout 3 into the settler. A convenient means for accomplishing this, consists of
55 a hopper 5 for the reception of the flue dust,

the lower end of this hopper terminating in a contracted spout 6, so disposed as to discharge the flue dust directly into the stream of slag and matte flowing into the settler. In order to regulate the feeding of the flue dust,
60 the contracted lower portion of the hopper is provided with a suitable valve 7.

Flue dust, being fine and dry, is in proper form for smelting and as it is self-fluxing, it will generate heat in the settler. As the flue
65 dust is fed to the slag and matte during the flow of the latter from the spout of the blast furnace to the settler, it will pass with said slag and matte into the body of molten slag under the slag crust indicated at 8 on the
70 drawing. The heat of the slag and matte flowing from the furnace and the self-fluxing quality of the flue dust will be utilized in causing the smelting of the latter in the settling tank,—the metal in the flue dust being
75 precipitated with the metal or matte which has been smelted in the furnace and conducted to the settler.

From two to five per cent. of the contents of a charge of ore to the furnace, goes out to
80 the dust chamber as flue dust. With my improvements all of this flue dust can be dropped into the stream of matte and slag from the furnace to the settler and smelted without the need of any added fuel.

85 Having fully described my invention what I claim as new and desire to secure by Letters-Patent, is,—

1. The herein described smelting process, consisting in discharging slag and matte
90 from a furnace to a settler, and discharging fine ore into the stream of slag and matte as the same flows from the furnace to the settler.

2. The herein described process, consisting
95 in mixing fine ore with molten slag and matte issuing from a smelting apparatus.

3. The herein described process, consisting in discharging molten slag and matte downwardly into a settler and discharging fine ore
100 into said downwardly flowing stream of molten slag and matte, whereby said fine ore will be carried by said stream into the body of molten slag and matte in the settler.

4. The herein described process, consisting
105 in discharging flue dust with molten slag and matte into a receptacle and smelting the flue dust in said receptacle.

5. The herein described process, consisting
110 in smelting a body of ore in a furnace, dis-

charging the molten slag and matte from
said furnace to a receptacle, discharging flue
dust or fine ore with the slag and matte into
said receptacle and utilizing the heat of said
5 molten slag and matte and the self-fluxing
quality of the flue dust to smelt the latter in
said receptacle.

In testimony whereof, I have signed this
specification in the presence of two subscrib-
ing witnesses.

ALEXANDER R. McKENZIE.

Witnesses:

DUNCAN M. GILLIS,
ROGERS W. BERRY.