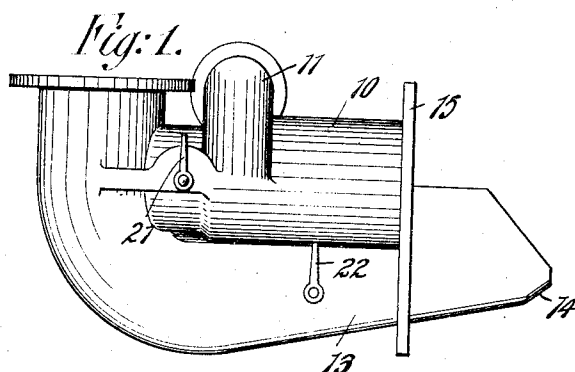
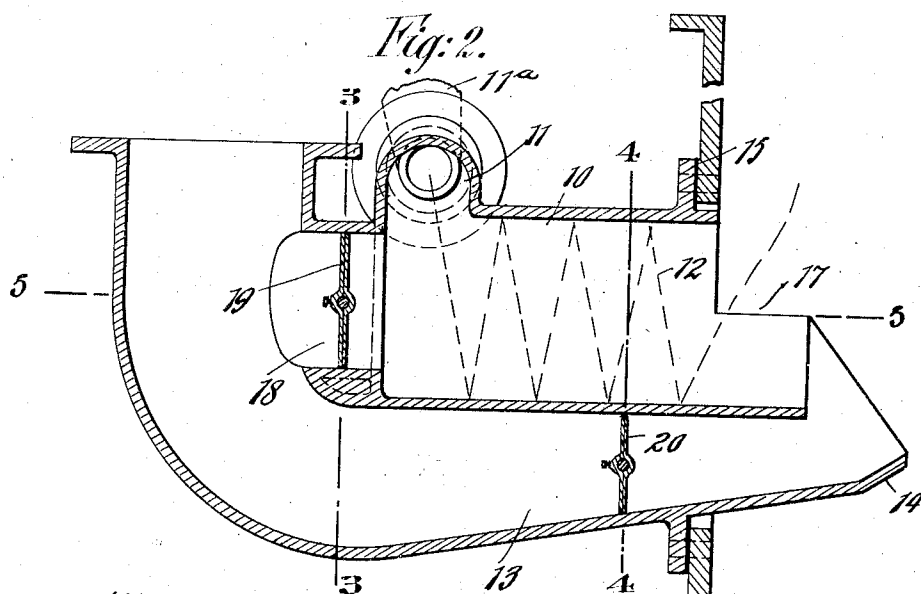
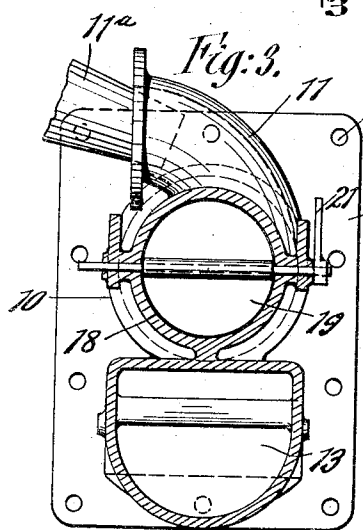
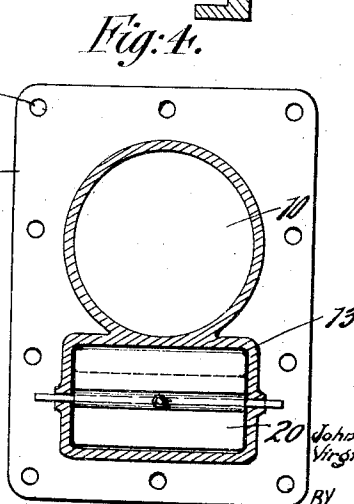


V. Z. CARACRISTI & J. E. MUHLFELD.
 APPARATUS FOR BURNING PULVERIZED COAL.
 APPLICATION FILED SEPT. 1, 1916.

1,265,172.

Patented May 7, 1918.
 2 SHEETS—SHEET 1.

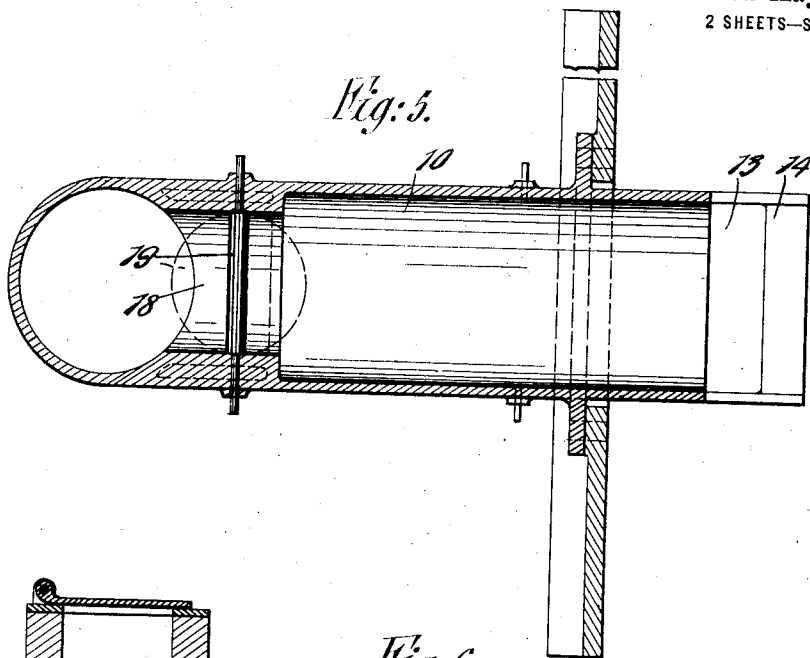
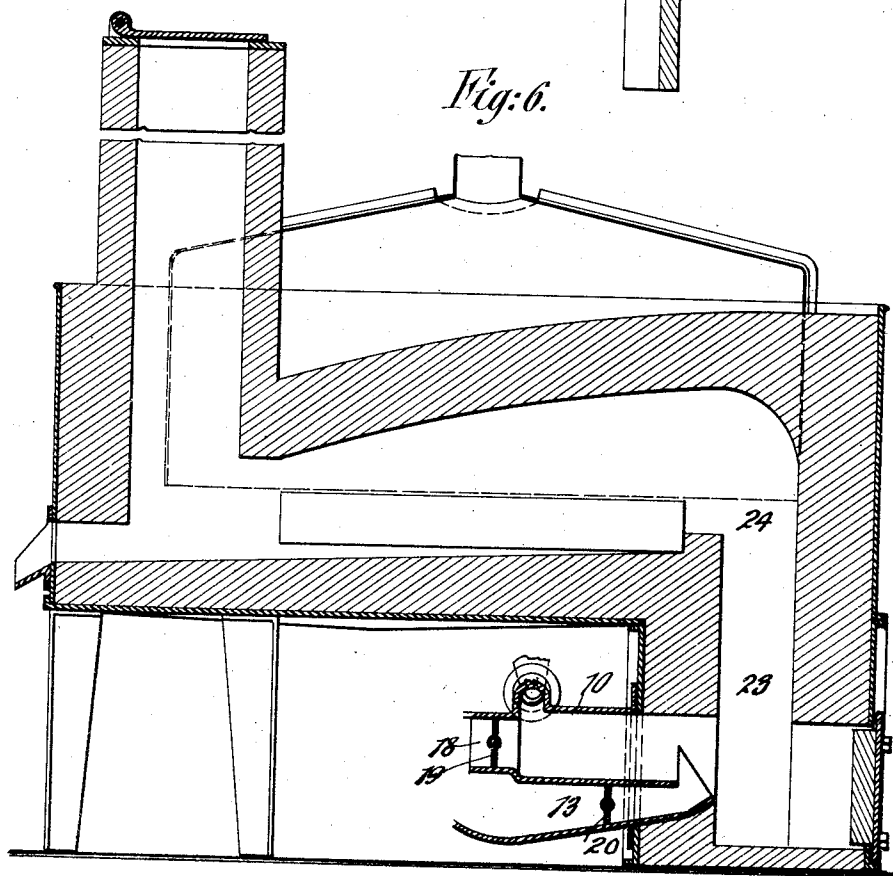


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NEW YORK.

APPARATUS FOR BURNING PULVERIZED COAL.

1,265,172.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed September 1, 1916. Serial No. 118,014.

To all whom it may concern:

Be it known that we, VIRGINIUS Z. CARACRISTI and JOHN E. MUHLFELD, citizens of the United States of America, the former a resident of Bronxville, in the county of Westchester and State of New York, and the latter a resident of Scarsdale, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Apparatus for Burning Pulverized Coal, of which the following is a specification.

The present invention relates to improvements in apparatus for burning pulverized coal, and particularly for use with such furnaces as forging furnaces or the like, where it is essential to obtain an intense heat, properly directed and which may be conveniently and positively regulated.

With these and other objects in view, our invention is shown in the accompanying drawings, and will be hereinafter more fully described with reference thereto and finally pointed out in the claims.

In the drawings:

Figure 1 is a side elevation of our improved burner, showing the same detached from the furnace,

Fig. 2 is a vertical longitudinal sectional view thereof,

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2,

Fig. 4 is a similar view taken on the line 4—4 of Fig. 2,

Fig. 5 is a longitudinal section taken on the line 5—5 of Fig. 2, and

Fig. 6 shows in section the application of our improved burner to a small forge furnace.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, our invention comprises a cylindrical fuel feed and mixing chamber 10, to which fuel is fed tangentially under pressure therethrough by means of the orifice 11, to the furnace, the dotted lines 12 indicating the helical path which the fuel takes. The pitch of this path, and the length of time the fuel remains in the chamber is determined by the inclination of the nozzle 11 feeding the fuel into the orifice, and also by the inertia of the fuel traveling at relatively high velocity. An air channel 13 is arranged below the cham-

ber 10, gradually contracted toward its forward end, and gradually evolving from substantially semicircular cross-section as shown in Fig. 3 to rectangular cross-section as shown in Fig. 4. The forward end extends beyond the end of the chamber 10 and is turned up as at 14. A flange or burner plate 15 is provided surrounding the inner or forward end of the chamber 10 and channel 13, and serves to secure the channel to the wall of the furnace by means of bolts passing through the bolt holes 16 thereof.

As shown in Fig. 1 the outer surface of the walls of the chamber 10 and channel 13 within the furnace present a smooth and continuous surface. The upper half of the chamber 10 within the furnace is cut away as at 17.

At the rear or outer end of the burner the channel extends behind the chamber, and is connected to the chamber 10 by a passage 18, through which air for combustion is supplied to the fuel in the chamber, a valve 19 being provided therein for controlling the amount of air admitted to the chamber. A valve 20 is provided in the channel 13 for controlling the flow of air therethrough. These valves are respectively actuated by handles 21 and 22 at the outside of the burner.

The fuel emerging from the inner end of the chamber 10 is intermingled and supported by the underlying strata of air from the channel 13, and travels upwardly through the preliminary combustion zone 23 (Fig. 6) and is forced into the furnace through the orifice 24. The upward turn given to the outlet end 14 of the air-channel 13 causes the stream of air issuing therefrom to assume the condition of an upwardly-moving column the lower end of which is below, and in advance of, the outlet of the feed and mixing chamber 10.

The furnace may be of any well known type, and for convenience of illustration is shown as a small forge furnace and if necessary or desirable, a plurality of burners may be applied to the furnace.

It will be seen that in addition to the mixing and feeding forward of the fuel in the chamber 10, a supporting column of air is supplied to the emerging mixed fuel, whereupon there is a thorough intermingling of the fuel and air within the preliminary combustion chamber 23, and as the

mixture rises therein, there is a progressive combustion within this chamber, and at the orifice 24 the combustion is completed.

In this manner the greatest amount of heat energy is produced from a given amount of fuel and its force is most effectively directed.

We have illustrated and described a preferred and satisfactory form of our invention, but it is obvious that changes may be made therein, within the spirit and scope thereof as defined in the appended claims.

We claim:

1. In an apparatus for burning pulverized fuel, two chambers or channels located one above the other, the lower chamber forming an air-channel which at its outlet end projects beyond the outlet of the upper chamber and has its outlet directed exclusively upwardly to discharge an ascending column of air, and means for supplying fuel to the upper chamber.

2. In an apparatus for burning pulverized fuel, fuel feeding and mixing means, means for supplying combustion air to the fuel in the feeding and mixing means, and means for supplying an underlying ascending column of air to said fuel emerging from said feeding and mixing means, the air of said column being adapted to be intermingled with the said fuel.

3. In an apparatus for burning pulverized fuel, a fuel feeding and mixing chamber, means for supplying fuel tangentially to said chamber, and directing the same helically therethrough, means for supplying combustion air to the fuel in said chamber, means for controlling the supply of said combustion air, means for supplying an underlying column of air to said fuel emerging from said chamber, said air adapted to be intermingled with the said fuel, and means for controlling the supply of air through said last named means.

4. In an apparatus for burning pulverized fuel, the combination with a furnace having a combustion chamber, of a burner comprising a fuel feeding and mixing chamber,

means for supplying combustion air to the fuel in the chamber, and means for supplying an underlying ascending column of air to said fuel emerging from said chamber, the air of said column being adapted to be intermingled with said fuel in the combustion chamber, the combustion of said fuel proceeding progressively through said combustion chamber, to complete combustion at the end of said chamber.

5. In an apparatus for burning pulverized fuel, two channels for delivering fuel and air respectively, the outlet of the air-channel being below, and in advance of, the outlet of the fuel channel, and directed upwardly to discharge an ascending column of air.

6. In an apparatus for burning pulverized fuel, two channels for delivering fuel and air respectively, the outlet of the air-channel being below the outlet of the fuel channel, and directed upwardly to discharge an ascending column of air adjacent to the fuel outlet.

7. In an apparatus for burning pulverized fuel, a fuel-channel provided with an outlet at its forward end and with a fuel-inlet at its rear portion, an air-channel the rear portion of which communicates with the rear portion of the fuel-channel, and the front portion of which has an outlet located below, and in advance of, the outlet of the fuel-channel, and directed upwardly to discharge an ascending column of air, a valve located in the air-channel to regulate the flow of air therethrough, and another valve controlling the communication between the rear portions of the two channels.

In testimony, that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

VIRGINIUS Z. CARACRISTI.
JOHN E. MUHLFELD.

Witnesses:

J. C. CHAPPLE,
C. G. MILLER.