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1,554,907

G. C. BROWN
SHEET OR TIN FURNACE

Filed Oct. 8, 1923

Fig. 1.

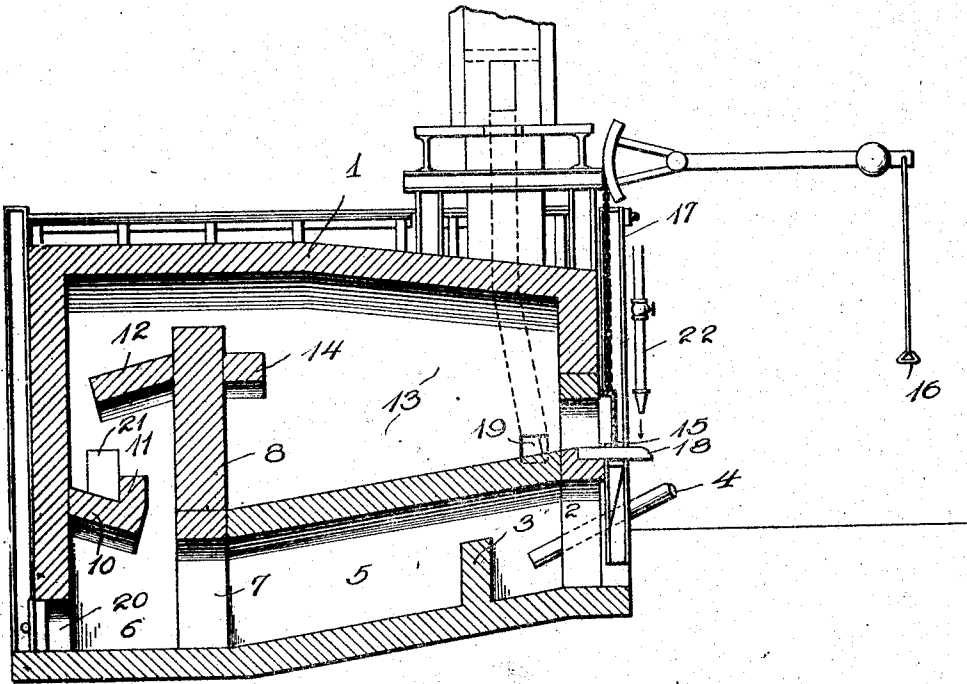
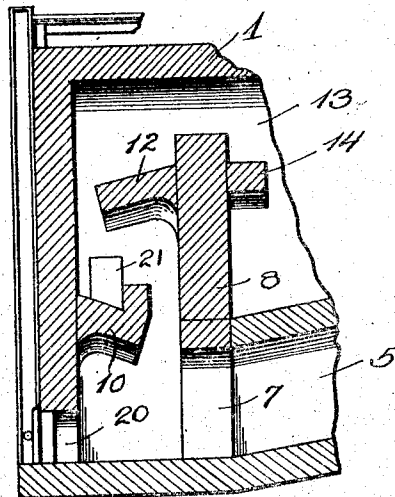


Fig. 2.



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SHEET OR TIN FURNACE.

Application filed October 8, 1923. Serial No. 667,292.

To all whom it may concern:

Be it known that I, GEORGE CLARK BROWN, citizen of the United States, residing at Warren, in the county of Trumbull and State of Ohio, have invented certain new and useful Improvements in Sheet or Tin Furnaces, of which the following is a specification.

This invention relates to improvements in furnaces and more particularly to sheet or plate heating furnaces using powdered coal as fuel.

In heating sheet or plates of tin, sheet steel, black plates and the like in furnaces of this type, it has been found that particles of the powdered coal and dust particles are held in suspension through the various combustion chambers in a non-ignited state, and are carried to, and embedded in the plates or sheets being heated, forming thereon a pitted and uneven surface. During the pickling process, prior to the tin plate bath or terne plate bath, the picric acid decomposes or eats away the embedded coal and dust particles thereon, leaving the plate with a pitted or pock-marked surface. This condition, of course, results in very serious disadvantages as a plate or sheet so pitted is considered of inferior quality.

The main object of my invention is to provide a furnace in which a sheet or plate of tin sheet steel or the like may be heated to produce a clean and even surface.

A further object of my invention is to provide a furnace which delivers a clean and pure flame to the sheet or plate to be heated and thereby prevents fuel particles being embedded therein.

Another object of my invention is to provide in a heating furnace an arrangement which furthers a more complete combustion of the fuel and which results in a high efficiency in use.

A still further object is to provide a furnace structure and arrangement which increases the effectiveness of the functioning thereof and to a material degree limits any waste incident to the use thereof.

A further object is to provide a furnace which is simple and practical in design, efficient in operation and one which is easily accessible for cleaning or repair purposes.

Other objects will be in part obvious from the annexed drawings and in part indicated from the following analysis of the invention.

The invention accordingly consists in the features of construction, combination of parts, and in the unique relation of the various members and the relative proportioning and dispositioning thereof, all as more clearly outlined herein.

To enable others skilled in the art to fully comprehend the underlying features thereof, in order that they may embody the same, by numerous modifications in structure and relation contemplated by this invention, drawings depicting the preferred forms have been annexed as part of this disclosure and, in such drawings, like characters of reference indicate corresponding parts throughout all the views, of which—

Figure 1 is a longitudinal section of my improved furnace structure; and

Figure 2 is a modification of the arrangement of the baffle plates.

With reference to Figure 1, a furnace 1 of the usual type is shown having a mixing or ignition chamber 2 and a bridge or baffle wall 3. The pulverized fuel, which, in this instance, is powdered coal, is fed into the chamber 2, through the tube 4, either by means of a mechanical stoker or by means of compressed air, and ignition of some of the particles of coal there takes place. A primary combustion chamber 5 is provided opening into a secondary combustion chamber 6 through the opening 7 in a bridge wall 8.

Arranged on the rear wall of the furnace and extending transversely across the same at a slightly higher elevation than the opening 7 in the bridge 8 is a baffle wall 10 which is deflected downwardly at an angle less than the horizontal and forms with the rear wall an acute angled pocket. Positioned at the inner end of this baffle wall is the upwardly extending portion 11. A second baffle 12 is positioned on the bridge 8 at a suitable distance above the upraised portion 11 and is also deflected downwardly and forms with the bridge 8 a second pocketing arrangement.

The bridge 8 extends for a portion of the height of the furnace over which bridge the gases are led into a heating compartment 13, and deflected outwardly by an arch 14 on the bridge 8.

The plates or sheets to be heated are placed in the heating chamber 13 through a door 15, which is adapted to be raised or lowered through a bar and handle 16 in the

channel bar 17. A suitable table or runway 18 is provided outside of the door acting as a support or guideway for the plates prior to their entry into the heating compartment 13, and also provides a support by which the plates can readily be removed.

A pipe 22 having a suitable valve control is positioned outside of the furnace 1 and adjacent to the door 14 by which air or steam from any suitable source may be utilized to clean the plates or sheets of any dust or foreign substances thereon before their entry into the furnace or to clean the packs while in the furnace before the latter is thoroughly heated.

A flue 19 is provided near the front of the furnace whereby the exhaust gas or gases of combustion may be directed from the furnace.

Clean-out doors 20 and 21 are provided in the secondary combustion chamber 6, the door 20 being positioned at the bottom thereof and the door 21 arranged at the upper surface of the baffle plate 10, whereby dust particles or unignited fuel particles deflected by the baffles 10 and 12 may be readily removed.

In Figure 2, I have shown a modification of my arrangement of baffle plates and have provided an alternative construction in which the baffle plates have a curved arc of deflection to pocket and deflect the flame and hot combustible gases.

The operation, of course, is evident from the above. It is seen, however, that the powdered coal fed through the tube 4 is partially ignited in the mixing and ignition chamber 2, and the flame is directed upwardly and rearwardly by the baffle wall 3 into the primary combustion chamber 5. Some of the unignited fuel particles are arrested by the baffle plate 3 and drop back to be ignited by the upcoming flame or to be deposited at the base of the ignition chamber from whence they can be easily removed. Further combustion takes place in the chamber 5 and the flame with the suspended particles is advanced into the secondary combustion chamber 6, where it is pocketed and deflected by the baffle 10. The downward deflection of this baffle plate checks and forces downwardly the flame and results in more particles of the fuel being arrested either to drop or to be ignited in the hot upcoming flame.

The flame now rises through the tortuous passageway between the baffle 10 and the bridge wall 8, where it is again checked and arrested by the baffle 12, the dust particles falling downwardly on the upper surface of the baffle 10 or being further ignited in the hot flame. The flame then passes over the bridge wall 8 and is directed outwardly by the arch 14, to deliver to the heating chamber and the plates or sheets placed therein

a flame which is entirely clean and pure, the dust particles having been positively removed or ignited by the baffle arrangement.

It is thus seen that by my arrangement of baffle plates and tortuous passageways in the combustion chambers a clean flame is delivered to the plates and combustion is furthered to a very material extent, thereby ensuring a high degree of efficiency and utility.

Without further analysis, the foregoing will so fully reveal the gist of the invention that others can, by applying current knowledge, readily adapt it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

I claim:

1. In a furnace for pulverized fuel, the combination of a combustion chamber and means in said combustion chamber to remove suspended, non-ignited fuel and dust particles from the flame, said means comprising a plurality of downwardly deflecting walls arranged therein.

2. In a furnace for pulverized fuel, the combination of a combustion chamber and means comprising a plurality of alternately arranged and downwardly deflecting baffle walls arranged in said combustion chambers whereby suspended fuel and dust particles are removed from the flame.

3. In a furnace for pulverized fuel, in combination, a heating chamber, an ignition chamber, a primary combustion chamber separated therefrom by a baffle wall, a secondary combustion chamber receiving the hot gases and flame from said primary combustion chamber, and means in said secondary combustion chamber to ensure a clean flame passing to said heating chamber.

4. In a furnace for pulverized fuel, in combination, a heating chamber, an ignition chamber, a primary combustion chamber separated therefrom by a baffle wall, a secondary combustion chamber receiving the hot gases and flame from said primary combustion chamber, and means in said secondary combustion chamber to ensure a clean flame passing to said heating chamber, said means comprising downwardly deflecting baffle plates whereby dust or fuel particles in suspension are deflected downwardly.

5. In a furnace for pulverized fuel, in combination, a heating chamber, an ignition chamber, a primary combustion chamber separated therefrom by a baffle wall, a secondary combustion chamber receiving the hot gases and flame from said primary combustion chamber, and means in said second-

ary combustion chamber to ensure a clean flame passing to said heating chamber, said means comprising downwardly deflecting baffle plates arranged therein and positioned 5 to provide a tortuous passageway for said flame and suspended fuel carried thereby.

6. A sheet or plate furnace comprising a heating chamber and an ignition chamber, means for supplying pulverized fuel to said 10 ignition chamber, a primary combustion chamber separated from said ignition chamber by a baffle wall, a secondary combustion chamber receiving the flame and suspended fuel therein from said primary combustion 15 chamber, a bridge separating said secondary combustion chamber from said heating chamber, and downwardly deflecting baffle walls arranged alternately on the furnace and on said bridge wall whereby suspended particles of fuel and dust carried thereby 20 are deflected through a tortuous passageway.

8. In a furnace for pulverized fuel, the combination of combustion chambers and a plurality of deflecting baffle walls arranged 40 therein to deflect and arrest dust or non-ignited fuel particles suspended in the flame.

In testimony whereof I have signed my name this 28th day of Sept., 1923.

7. A sheet or plate furnace comprising a heating chamber and an ignition chamber,

GEORGE CLARK BROWN.