Feb. 18, 1930. T. P. ANTHONY 1,747,208

CUPOLA FURNACE

Filed March 27, 1929

Fig. 1.

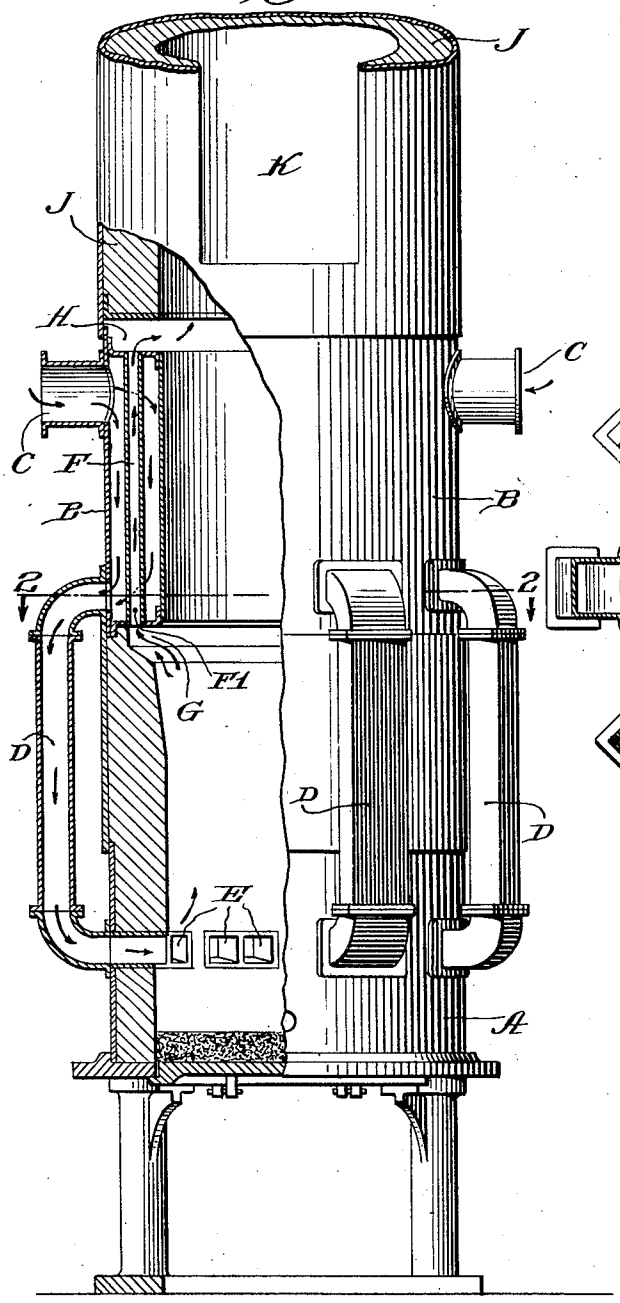
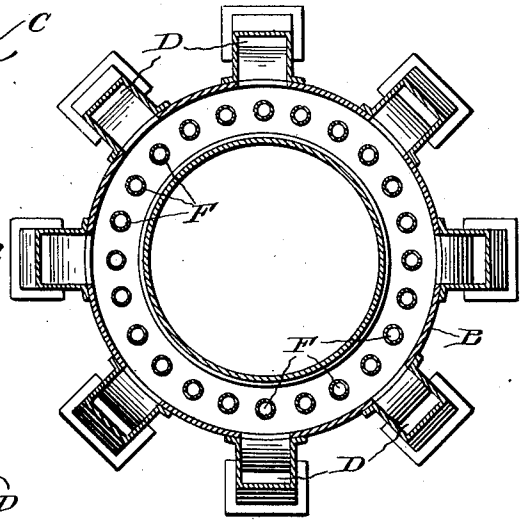


Fig. 2.



Witness:

Inventor
Thomas P. Anthony,
By Francis X. Chandler
Attorney.

Patented Feb. 18, 1930 1,747,208

UNITED STATES PATENT OFFICE

THOMAS PEACOCK ANTHONY, OF EDGEWATER PARK, NEW JERSEY

CUPOLA FURNACE

Application filed March 27, 1929. Serial No. 350,254.

My invention relates to cupola furnaces and has for its object to provide an efficient and economical construction for heating the air which is delivered under pressure to the tuyères of the furnace and also to provide a construction which will somewhat retard the combustion of the fuel in the upper zones of the furnace.

Generally speaking, my invention consists in providing at an intermediate section of the cupola wall a hollow wall section in which are formed passages for air and gas and which constitutes a heat exchange apparatus connecting the gas passages to the furnace so that the combustible gases generated in the furnace will pass in part at least into said passages, providing means for introducing air to such gas passages to promote combustion therein and providing means for passing air under pressure through the air passages of the wall section and from said wall section to the tuyères of the furnace. By preference I form the hollow wall section of metal plates, those forming the inner wall of the section being of such a character as to resist a high degree of heat without deformation. I connect this hollow wall with the air passages and extend through the hollow wall a series of gas conduits connected with the cupola so as to receive the gas generated therein and provided with air inlets at their bottoms which preferably receive their air supply from the hollow chamber through which the pressure air is passing.

My improved construction is illustrated in the drawings in which Figure 1 is an elevation of a portion of a cupola furnace shown partly in section and provided with my improvements.

Figure 2 is a cross section on the line 2—2 of Fig. 1.

A indicates the lower portion of the cupola which I construct in any usual manner and B indicates the intermediate wall section made up as shown of a hollow annulus of metal having conduits for air under pressure indicated at C leading into its top and conduits indicated at D leading into the tuyères which are indicated at E. F indicates gas passages extending through the hollow wall section and connected with openings G leading to the inside of the cupola and at top the passage H connecting with the upper part of the cupola. F^1 indicates openings in the lower ends of the gas passages F, through which air under pressure can enter said passages from the hollow wall B. In the construction shown, this upper part of the cupola is made up of a metal wall I supporting a refractory lining indicated at J. K is the charging tower of the cupola.

It will be obvious that the combustible gases generated in the lower part of the cupola will, following the line of least resistance, pass through the openings G into the gas passages F, issuing preferably, as shown, from the tops of said passages into the upper part of the cupola. Air under pressure from the hollow wall B will enter the gas passages through the openings F^1, thereby promoting combustion of the gases in the gas passages but air under pressure entering the hollow wall through the conduit C will be heated by passing in contact with the gas passages F and the heated inner wall of the hollow wall and the heated air will pass through the conduits D to the tuyères indicated at E.

It will be obvious that my construction affords an efficient way of heating air passing to the tuyères and also that considerable heat will be communicated to the air through the inner wall of the hollow wall. It will also be obvious that by withdrawing a considerable amount of the heated combustible gases from the intermediate portion of the cupola and also by withdrawing heat from the intermediate portion of the cupola stack through the hollow wall of the section B, the combustion of the fuel in this portion of the cupola will be retarded and this I consider an advantageous feature of my construction.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a cupola furnace an intermediate wall section made up of passages for air and gas and constituting a heat exchange device in combination with gas outlets leading from the cupola to the gas passages, means

for introducing air under pressure to said gas passages to promote combustion of the gas, conduits for air under pressure connecting with the air passages of the wall section, tuyères, and conduits for heated air passing from said air passage to the tuyères.

2. In a cupola furnace provided with tuyères an intermediate wall section forming a hollow chamber in combination with conduits for air under pressure leading to said chamber and from said chamber to the tuyères, gas conduits located in the hollow chamber, connections from the cupola to said gas conduits and means for introducing air to said gas conduits to promote combustion therein.

3. A cupola furnace having the features of claim 2, in which the hollow chamber forming the intermediate wall chamber is formed with metal walls.

4. A cupola furnace having the features of claim 2, in which the means for introducing air to the gas passages consist of openings from the hollow chamber into said gas passages.

THOMAS P. ANTHONY.