

No. 865,868.

PATENTED SEPT. 10, 1907.

W. E. COLE.
FURNACE AIR FEEDING MECHANISM.
APPLICATION FILED JULY 19, 1906.

Fig. 1.

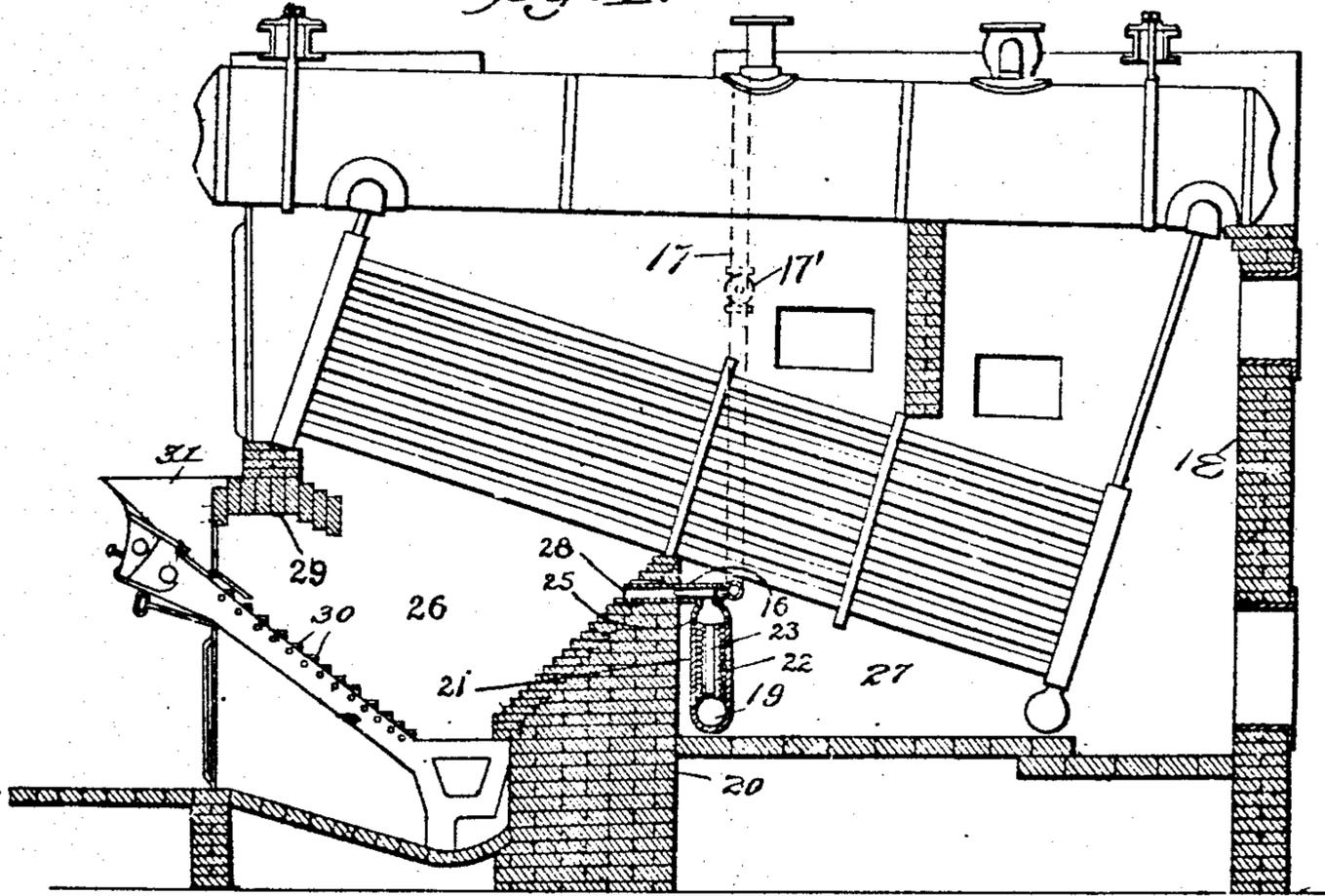


Fig. 2.

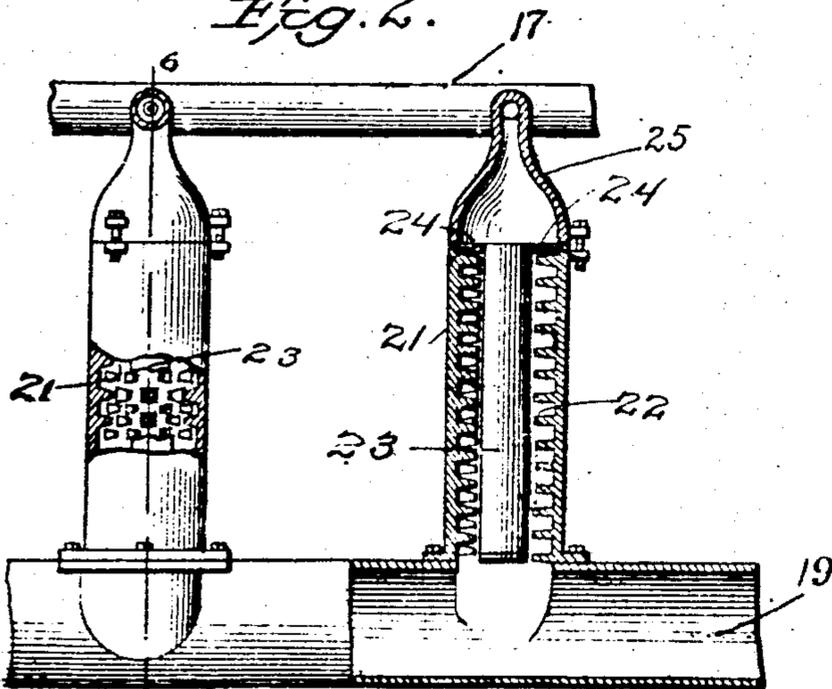
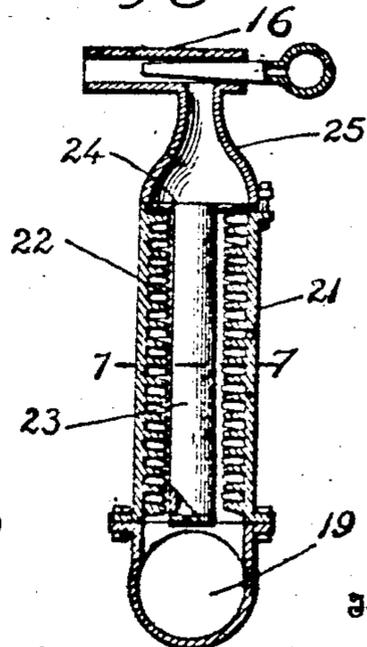


Fig. 3.



Inventor

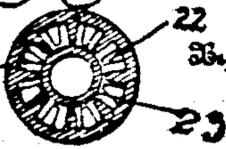
William E. Cole

Witness

J. M. Fowler Jr

Edgar M. Kitchin

Fig. 4.



Mason, Tomwick & Lawrence
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM E. COLE, OF NORFOLK, VIRGINIA.

FURNACE AIR-FEEDING MECHANISM.

No. 865,868.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed July 19, 1906. Serial No. 327,109.

To all whom it may concern:

Be it known that I, WILLIAM E. COLE, a citizen of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented certain

5 new and useful Improvements in Furnace Air-Feeding Mechanism; 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

10 appertains to make and use the same. The object of the invention is to supply highly heated air to the products of combustion rising in the flame from the burning fuel; the means for heating the air being of a construction and a capacity that will produce the desired result.

15 A further object is to produce an air heater that can be installed in the boiler furnace inclosure of any style of boiler furnace that has a bridge wall at the rear end of the fuel grates.

20 Figure 1 is a longitudinal, vertical section taken through a water tube boiler furnace inclosure, provided with an air feeding and superheating mechanism involving the features of the invention. Fig. 2 is an enlarged detail view of a fragment of the heating mechanism detached parts being seen in elevation and parts

25 in vertical sections. Fig. 3 is a vertical section taken on the plane of line 6-6 of Fig. 2. Fig. 4 is a transverse section taken on the plane indicated by line 7-7 of Fig. 3.

30 It is well known to those familiar with the burning of bituminous coal that when the fire is freshly stoked a considerable amount of unconsumed products of combustion goes out of the furnace up the smoke stack and is a dead loss.

35 The only way to ignite the coal gases in the furnace is to introduce preheated air that is heated to an intense degree into the flame near the bed of burning fuel, then the entire heating surface of the boiler gets the benefit of almost perfect combustion.

40 In Fig. 1 I have illustrated the mechanical manner in which the invention is installed in the rear of the bridge wall 20 in the combustion chamber 27 which is inclosed within the boiler inclosure walls 18.

45 The air supply inlet pipe 19 leading from the outside into the inclosure is preferably run transversely across the combustion chamber 27 in close touch with the bridge wall 20 though the air supply inlet pipe 19 can be modified to receive air from below through the foundation floor of the boiler, or from any other direction so that it reaches the bottom of the main body of the

50 air heater 21, said heater being supplied with a horizontal flange adapted to be bolted or otherwise removably secured to the air inlet pipe 19.

55 The body portion of the heater 21 has integrally cast on its inner face projecting pins 22, preferably placed in a staggered relation. An annular space is left in the center surrounded by the projecting pins 22 and

practically closed by the deflecting filler 23. Said filler can be of solid core or a tube closed at the top or bottom as is indicated by the bottom of the filler 23 in Fig. 3. A narrow flange 24 is made onto the top of the 60 deflecting filler 23 to rest on the points of the projecting pins 22 thereby suspending and holding the filler in position, or it may be held in position in any other suitable manner, at the same time ample space being left between the flange 24 and the inner surface of the 65 heater 21 for the passage of the air.

To the top of the body of the heater 21 is bolted or otherwise secured a cap 25, on top of which is arranged an injector 16, said injector having a steam pipe connection 17 with the steam dome of the boiler. 70

17' is a valve to regulate the supply of steam to the injector 16. The nozzle of the injector 16 reaches into an aperture 28 in the bridge wall.

In Fig. 1 the furnace 25 is indicated as being equipped with a mechanical stoker of the Rooney type. 75

As the green coal is fed from the hopper 31 into the furnace 26, while it is coking the smoke and gases are rising therefrom. The arch 29 is to force said gases toward the flame but they only come in contact with one edge of the flame and the distance is so short from 80 the arch up to the boiler tubes that a very large amount of the products of combustion escapes unconsumed.

Directions to operate the invention: With the steam valve 17' turn steam into the injector 16 and it will draw air into the inlet pipe 19 to the heater 21, then the 85 deflecting filler 23 forces the air to pass upward among and impinge around the projecting pins 22, thereby causing the air to be so intensely heated by the time it reaches the injector 16 and is forced through aperture 28 into the furnace 26 that instantaneous combustion 90 is the result. It is also observable that when the heated air is forced into the furnace and consequently into and through the flame, that it goes under the arch 29, carrying a portion of the flame with it, then the gases rising from the coking fuel commingles with the intensely 95 heated air and all the gaseous products of combustion are ignited before they come from under the arch; then the boiler gets the full benefit of every unit of heat that the coal can produce.

The invention is adapted to any boiler setting so long 100 as there is a bridge wall with a space or combustion chamber in the rear of it.

In return flue boiler furnaces, as the flame is drawn toward the bridge wall the heated air is forced into the flame near the fuel and the coal gases are ignited before 105 they leave the furnace and fully consumed before they enter the return flues.

Having described my invention, I now desire to secure by Letters Patent the following claims:—

1. In a furnace air feeding mechanism, the combination 110 with a furnace inclosure, of a furnace having a bridge wall at its rear end, an air supply pipe in the rear of said

- bridge wall, an oxygen heater connected to said pipe, a plurality of projecting pins on the inner surface of said heater, and leaving a central opening, a deflecting filler extending in said opening, an injector connected to said heater with means for delivering the air therefrom to the products of combustion rising from the furnace fire.
- 5 2. In a furnace air feeding mechanism, the combination with a furnace inclosure, of an air supply pipe extending into the inclosure, an oxygen heater attached to said pipe, projecting pins arranged on the inner face of said heater, a filler extending centrally of said heater for preventing the passage of air longitudinally through the central opening left by the projecting pins and means for delivering air from the oxygen heater to the furnace inclosure.
- 10 3. In a furnace air feeding mechanism, the combination with a furnace inclosure, of a furnace with a bridge wall

In its rear end, an air supply pipe extending into the inclosure in the rear of the bridge wall, an air heater attached to said supply pipe, projecting pins on the inner surface of said heater, leaving a longitudinal opening therein, a deflecting filler removably positioned within said longitudinal space, a removable cap for said air heater, an injector, with steam pipe connection, to draw air into the supply pipe, and through the said heater and force it through the opening in the bridge wall into said furnace.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM E. COLE.

Witnesses:

JOHN L. FLETCHER,
EDGAR M. KITCHIN.