(No Model.) 2 Sheets—Sheet 1.

# P. J. BODE.

## SMOKELESS BOILER FURNACE.

No. 526,289. Patented Sept. 18, 1894.

Fig. 1

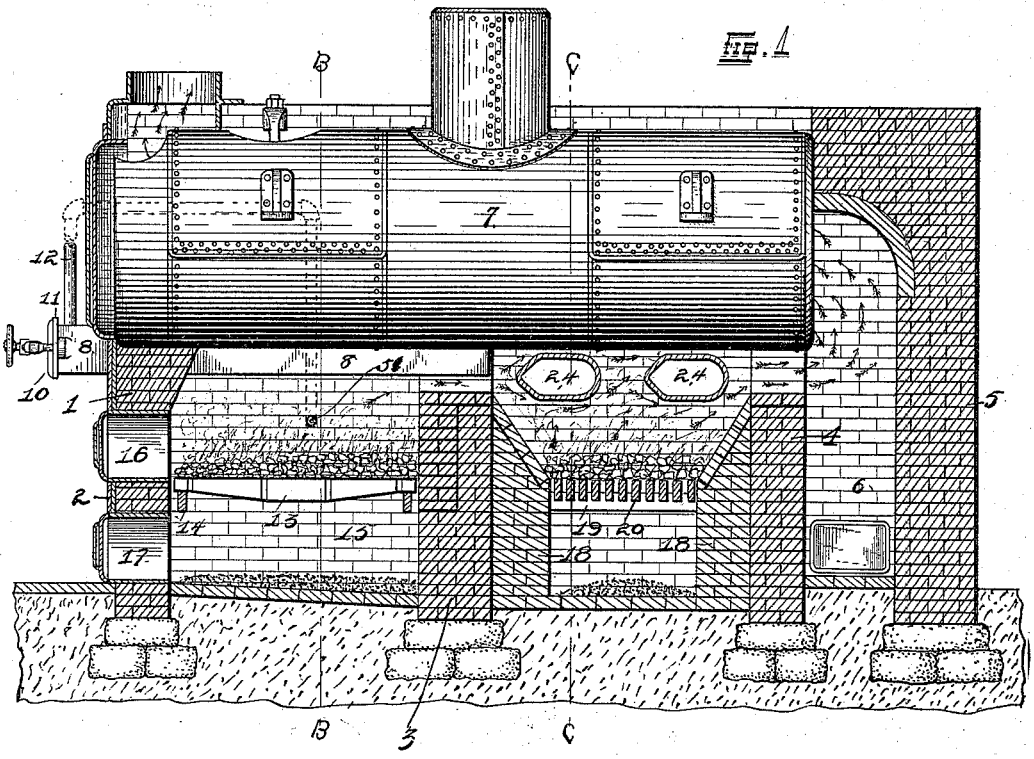



Fig. 2

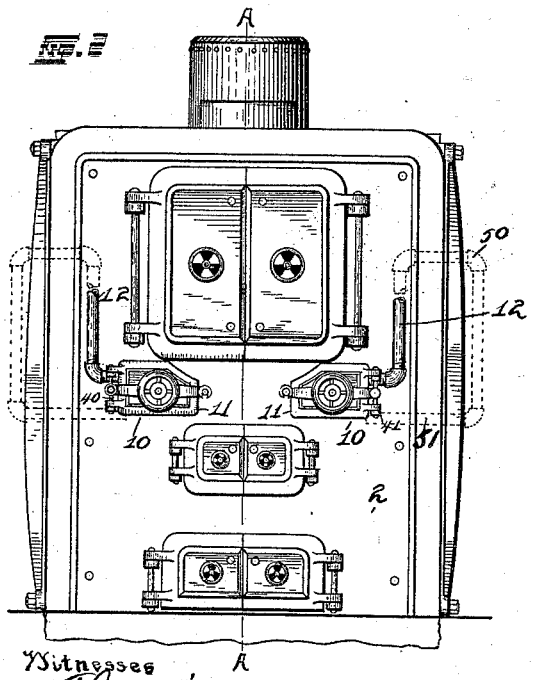
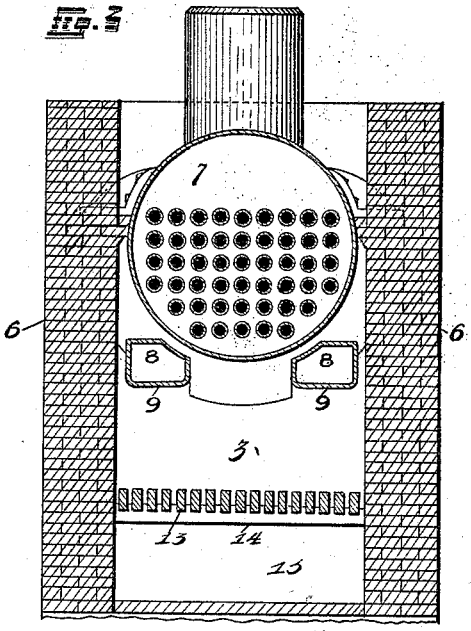



Fig. 3




Witnesses
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(No Model.) 2 Sheets—Sheet 2.

# P. J. BODE.

## SMOKELESS BOILER FURNACE.

No. 526,289. Patented Sept. 18, 1894.

Fig. 4

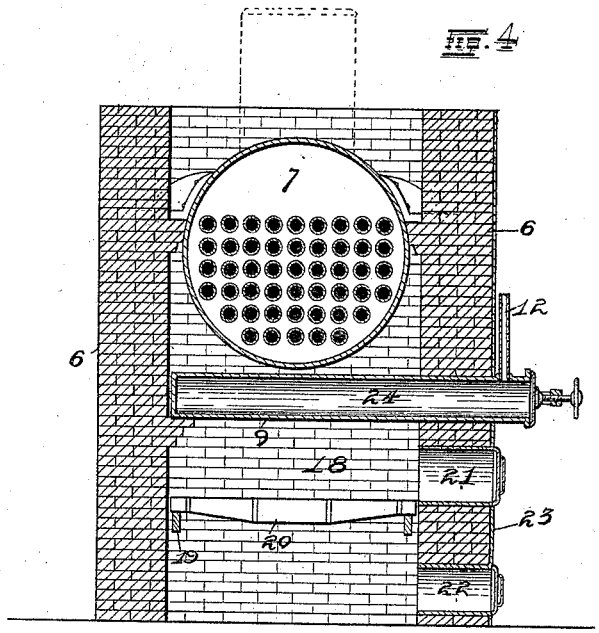



Fig. 5

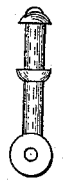


Fig. 6

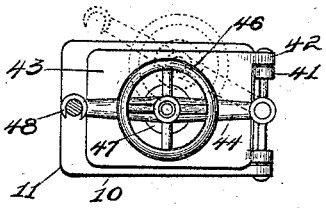



Fig. 8

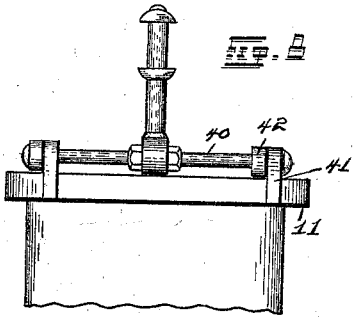
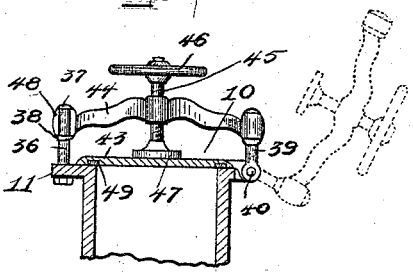



Fig. 7

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# UNITED STATES PATENT OFFICE.

PETER J. BODE, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-EIGHTH TO SOPHIA CUTLER, OF SAME PLACE.

## SMOKELESS BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 526,289, dated September 18, 1894.

Application filed March 6, 1894. Serial No. 502,516. (No model.)

*To all whom it may concern:*

Be it known that I, PETER J. BODE, a citizen of the United States, and a resident of St. Louis, State of Missouri, have invented certain new and useful Improvements in Smokeless Boiler-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in a "smokeless boiler furnace," and consists in the novel application and construction of parts, as will be more fully hereinafter described and set forth in the claims.

The object of my improvement is to apply a construction known as "gas retorts" under a boiler in boiler furnaces in order that the heat of the fire may be utilized to make fuel for maintaining the fire and also to furnish gas which may be used in connection with the fire or used for illuminating purposes. The product of these retorts is commonly known as coke and by its use, a very small amount of smoke is made while at the same time a higher temperature is reached. It is not necessary to detail the process of manufacturing gas as the necessary elements required to produce the desired result are well known; two of these elements being the proper kind of coal and a sufficiently high temperature to extract the gas from the coal, leaving the same in the form of coke. By the arrangement of the parts as shown in the drawings, what little smoke comes from the fire in front, is consumed by the other fire which is located in the rear. The object therefore is to construct a boiler furnace which will not make smoke; that is not emit smoke from the stack, means being provided for consuming such small amounts of smoke that may be made.

This feature of the invention makes the furnace a valuable one in view of the laws of some cities prohibiting smoke, but the main advantages appear to lie in the saving that is made by using coal, and utilizing both of the articles derived therefrom, using the coke for the fire and the gas for illuminating or heating purposes. It seems that the amount of coke produced would be far in excess of the amount necessary for the maintenance of the fires as coke generates a high degree of heat and is not quickly consumed.

Another point in the favor of this invention is the fact that slack coal can be utilized for the purpose and there would certainly be quite a saving in this feature. The cleanliness of the device is also apparent as the amount of ashes from the fire is less and the coke is much cleaner in handling.

It is thought that the peculiar combination of elements and principles as exhibited in this invention will prove the statements that are implied as to its usefulness and superiority over other furnaces in this particular line of manufacture.

In the drawings:—Figure 1 is a vertical longitudinal sectional view of my complete invention, as taken on the line A—A in Fig. 2. Fig. 2 is the front elevation of the boiler furnace as constructed after the method of my invention. Fig. 3 is a vertical transverse sectional view taken on the line B—B in Fig. 1. Fig. 4 is a similar view taken on the line C—C in Fig. 1. Fig. 5 is an enlarged end view of one of the parts of the invention. Fig. 6 is an end enlarged view of one of the retort doors of which the part shown in Fig. 5 is a portion. Fig. 7 is an inverted plan sectional view of one of the doors, showing the alternate position of the lock in dotted lines. Fig. 8 is an enlarged end view of the pin shown in Fig. 5, showing the manner of its application.

Referring to the drawings:—The furnace proper consists of a front wall 1 against which the boiler front 2 is secured, a bridge wall 3, a deflecting wall 4, the rear end wall 5 and the side walls 6.

The boiler 7 is set in the usual manner and the necessary flues and passages are constructed to form the draft. Under the boiler 7 and at each side are located retorts 8, which consist of the shells 9 constructed after the usual manner and provided upon the ends with sealing doors 10 adapted to be locked against the flanges 11 upon the ends of the retorts. As shown in Fig. 1, the retorts 8 protrude out in front of the boiler front 2 and are provided with pipes 12 which convey the gas to the supply tank.

The grate bars 13 are supported by transverse bars 14 in the fire chamber 15 which is located between the front wall 1 and the bridge wall 3.

The boiler front 2 and wall 1 are constructed in the usual manner with firing apertures 16 and openings 17 for the removal of ashes and any accumulation under the grate bars, these openings adapted to be closed by suitable doors.

Between the bridge wall 3 and the deflecting wall 4 are located two canted walls 18 suitably banked up from beneath and running transversely under the boiler. Supporting bars 19 connect the two walls and form a foundation for grate bars 20 which run transversely across the boiler furnace between the two side walls 6, the firing being done from the side of the furnace as is shown in Fig. 4.

The firing apertures 21 and the opening for removal of ashes 22 are located in the usual position and that side of the boiler furnace is provided with a front 23 through which protrude two retorts 24, similarly constructed to those shown as issuing from the front of the boiler furnace, except that they are of a different form. The forward ends of the two retorts 24 are tapered as particularly shown in Fig. 1 in order that a greater heating surface is provided, as the heat from the front fire passes over the bridge wall and encounters the front of the retorts, and the heat from the rear fire encounters them from underneath at the same time consuming any smoke that may come from the front fire.

I will now describe the construction of the retort front, which is a little different from others in that they are very easily closed and sealed without the complication of a mechanical construction. The front ends of the retorts are provided with a surrounding flange 11 in one side of which is secured a pin 36 having a flange 37 at its outer extremity and a similar flange 38 near the middle of its length. In the flange 11 opposite to the pin 36 is pivoted an oscillatory pin 39, the pivot 40 of this pin acting as a pin for the hinge connection between the lugs 41 upon the said flange 35 and the lugs 42 upon the door 43. The locking device consists of a frame 44 carrying a screw 45 and wheel 46 for its manipulation and a foot 47 upon the lower end of the screw to engage against the door 43 in order to lock it against the flange 11. The frame 44 is laterally adjustable from a line with the pin 39 owing to its connection therewith as shown in the drawings, while the free end of said frame 44 is provided with lips 48 which fit each side of the pin 36 between the flanges 37 and 38.

In Fig. 7 I have shown the locking device opened out so that the door can be opened and the coke removed from the retort and in Fig. 6 is shown the manner of opening the locking device away from the pin 36. In Fig. 7 is shown a gasket 49 which is let into the inner side of the door 43 to make the retort perfectly gas tight.

Pipes 50 are connected with the pipes 12, which lead to the retorts 8, and are shown in dotted lines in Figs. 1 and 2 as leading to horizontal pipes 51 (also shown in the said figures) the said horizontal pipes 51 being located above the grates to consume the smoke that may come from the fire, the horizontal pipes being constructed to jet the gas. It is apparent that the jets of gas could be introduced into any parts of the furnace to facilitate the heating of the retorts or boiler or the burning of the smoke that issues from the fire and the illustration given is simply shown to set forth this feature of the invention; namely the use of the gas manufactured by the device in its own operation.

As above stated, the gas can also be conveyed to a side tank from which it can be used for illuminating, heating or other purposes; or part of the gas may be used in the furnace and part in the supply tank.

It will be seen that the construction of this boiler furnace enables the handling of the fuel in such a manner as to prevent any smoke from coming out of the smoke stack and as this is the principal feature and object of the invention, it is thought that the statements as to its effectiveness are fully substantiated.

The location of the gas jets within the boiler furnace not only produces a greater heat but also provides for the consuming of whatever smoke may issue from the fire by the placing of the jets in a suitable position.

Having fully described my invention, what I claim is—

1. The combination in a boiler furnace, provided with two combustion chambers partially separated from each other by a bridge wall of longitudinal retorts located in one of the said compartments and transverse retorts located in the other compartment, substantially as described.

2. The combination in a boiler furnace, provided with two combustion chambers, partially separated from each other by a bridge wall, of a smoke stack connected with the second of the said chambers, retorts located in the first of the said chambers, and transverse retorts located in the second chamber behind the said bridge wall, the said transverse retorts having inclined forward faces substantially as described.

3. The combination in a boiler furnace, provided with two combustion chambers, partially separated from each other by a bridge wall, of a smoke stack connected with the second of the said chambers, retorts located in the first chamber, transverse retorts located in the second chamber behind the said bridge wall, the said transverse retorts having inclined forward faces, pipes connected with the interior of the several retorts and discharging into the corresponding combustion

chamber below the retorts, doors for the said retorts, and means for locking each of the said doors in place, the said means consisting of a fixed pin and an oscillating pin on the opposite sides of the front of each of the said retorts, a frame 44 pivoted to each of the said oscillatory pins and carrying a lip adapted to engage the opposite fixed pin and a screw passing through each of the frames and bearing on the corresponding door, substantially as described.

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

PETER J. BODE.

Witnesses:
HERBERT S. ROBINSON,
ALFRED A. EICKS.