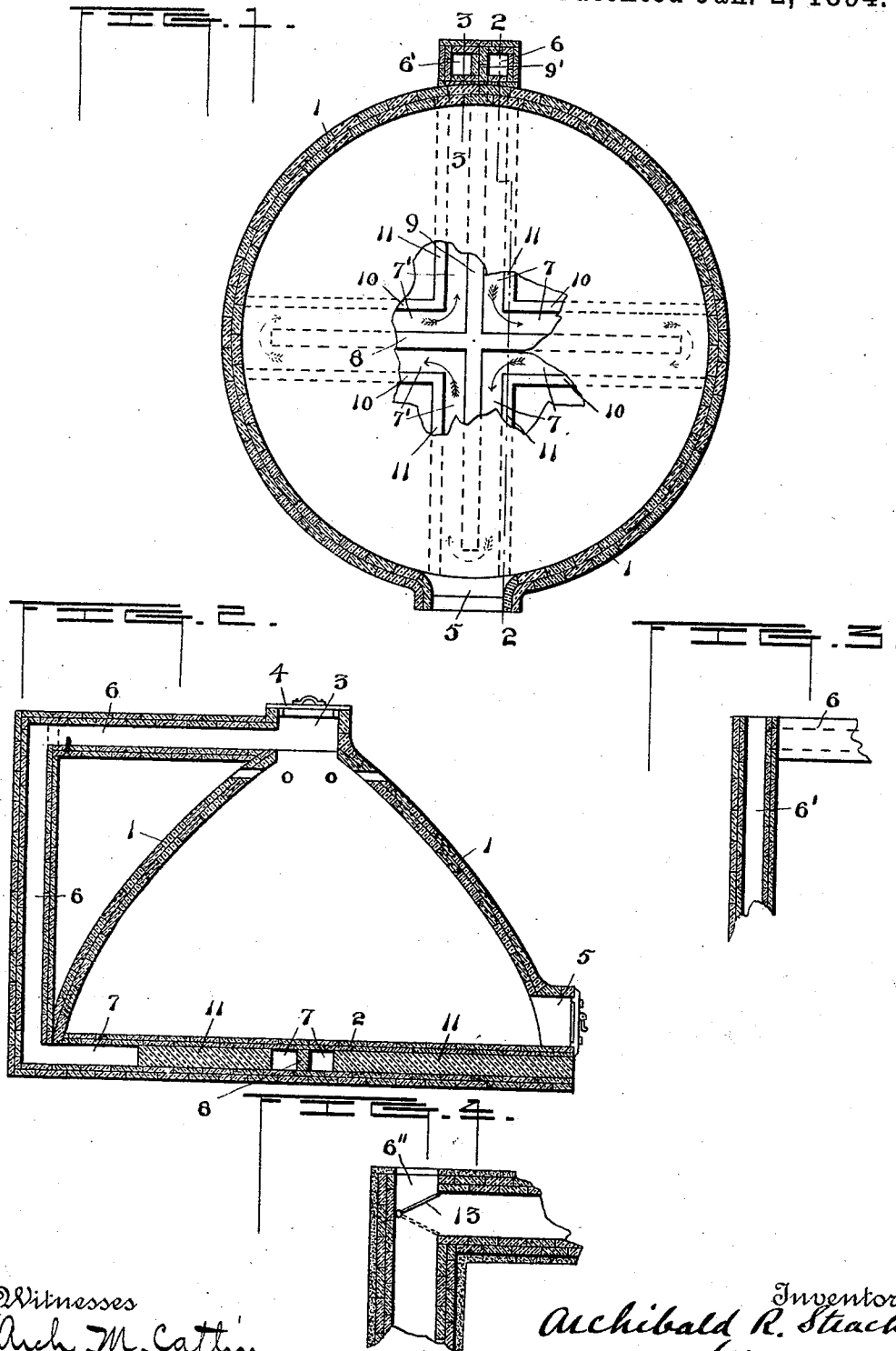


(No Model.)

A. R. STRACHAN.
COKE OVEN.

No. 511,974.

Patented Jan. 2, 1894.



Witnesses
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UNITED STATES PATENT OFFICE.

ARCHIBALD ROBERT STRACHAN, OF PINEVILLE, KENTUCKY.

COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 511,974, dated January 2, 1894.

Application filed March 20, 1893. Serial No. 466,907. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD ROBERT STRACHAN, a resident of Pineville, in the county of Bell and State of Kentucky, have invented certain new and useful Improvements in Coke-Ovens; and I do hereby declare the following to be a full, clear, and exact description of the invention, such will enable others skilled in the art to which it pertains to make and use the same.

The invention relates to coke ovens; and has for its object to increase their efficiency and economy of operation; and it consists in the construction hereinafter described and particularly pointed out.

In the accompanying drawings Figure 1 is a horizontal section taken just above the floor which is represented as partly broken away. Fig. 2 is a vertical section on line 2—2 of Fig. 1. Fig. 3 is a partial section on line 3—3 of Fig. 1; and Fig. 4 is a section of a modified detail.

The improvement is shown applied to an oven of the usual bee hive pattern, though it is not limited to such form, nor to any particular size or proportions. A height of about seven feet and a floor diameter of about ten and a half feet are however very suitable.

Numeral 1 indicates the outer wall of the oven and 2 its floor, the whole structure or all portions thereof most exposed to heat being preferably made of fire brick and the exterior flues protected against radiation by double walls or a non-conducting envelope, as indicated in Fig. 4.

3 denotes a coal charging or feeding chute and 4 its removable cover and 5 a door through which coke is removed from the oven.

6 denotes an exit flue for the hot products of combustion. This flue extends downwardly and communicates with a series of flues 7 formed beneath the floor by a cruciform chamber divided by a similarly shaped arrangement of partitions 8 and 9. Said chamber is inclosed by walls 10 and 11 running from the outer wall of the oven and meeting on opposite sides of the center and at a moderate distance therefrom as shown. The partition 8 at each of its ends extends near the wall but stops short thereof to form return bends in flues 7, 7'. In like manner a partition 9 is

made short at its front end to provide communication for the flues on each side thereof. This partition at the opposite end extends to the wall and has, in the present instance, a continuation 9' outside the oven and dividing the down-draft flue 6 from an up-draft flue 6'. The hot gaseous products of the limited combustion occurring in the oven ascend to its top and pass out through flues 6, 6', 7, 7', 6' heating the floor of the oven. It thus aids in the expulsion of the volatile and more inflammable constituents of the coal. If desired the flue 6', which is in fact a chimney, can be extended above the coke oven to insure requisite draft. The parallel and closely contiguous situation of the flues whereby the heat of those parts which are normally the hottest is utilized to maintain the heat of the other parts and thus secure a more even distribution of heat under the oven floor and at the same time quicken the draft is an important feature of the improvement. The close relation of the flues 6 and 6' whereby the latter is heated and the passage of gases through it quickened is also practically important, and the novel arrangement of walls and partitions by which the circuitous parallel flues are economically provided is also a characteristic feature of my invention.

In starting up, a fire is kindled on the floor of the oven with any usual fuel. Bituminous coal is then introduced through the opening 3 and becomes ignited and its more volatile, vaporous and gaseous constituents are burned or driven off with the effect to reduce the coal to coke, which from time to time is removed at the bottom, fresh charges of raw coal being introduced at the top to make the operation continuous. The products at first may be allowed to escape directly from the top of the oven through the opening 3. This is subsequently closed and the products then drawn into flue 6. In some cases the outer end of this flue may be connected with the open air or with a chimney by a passage 6' to permit the escape of the products through flue 6, see Fig. 4, and their discharge therefrom directly into the air.

13 denotes a damper which may be opened for this purpose. When the combustion is

properly started and the flue 6 heated the damper may be turned to close the outlet and compel the products to pass down through the flues under the oven floor. The use of this construction is optional.

It will sometimes be found desirable to admit air in the top of the oven above the coal to complete the combustion of the gases and develop heat, which would not otherwise be produced. Such heat is utilized in the flues both for heating the oven and for quickening circulation. Air inlets for this purpose are shown near the crown of the furnace in Fig. 2.

I am aware that flues have been used under the bottom of coking retorts and ovens and I do not broadly claim such feature of construction.

It is characteristic of my improvement that several parts of the flue for escaping hot products of combustion are arranged in close proximity to other parts of the same in such manner that throughout their whole extent those parts nearest the exit are heated by conduction and radiation of heat from other parts situated next in course toward the fire. Thus the gases when at their hottest pass through flue portions 6 and 7 and respectively heat the parts 6' and 7'. By this means the draft is stimulated and, ordinarily, other means of producing draft will not be required. As only a moderate degree of heat is desired this utilization of a part thereof is not disadvantageous. Neither is it essential that the flues should cover the entire bottom since the latter will be heated with practically sufficient evenness by conduction and radiation. It is obvious that the transverse dimensions of the flues can be varied.

The simplicity of the flue construction and the arrangement whereby access can be had to every flue by making openings in the exterior wall and the means for a direct initial

draft through a discharge such as 6'' are practically important.

Having thus fully described my invention, what I claim is—

1. In a coking oven having a charging chute in its top and an exit flue communicating with said chute, also with diving-flue 6 and with a series of flues beneath the oven floor formed by the cruciform chamber inclosed by walls connected to the oven walls, said chamber being divided by a main partition connected to the oven wall adjacent the said diving flue and extending near the opposite side of the oven and also divided by a partition transverse to the main partition and terminating at each end near the oven wall, said flues beneath the floor communicating with an up-draft chimney flue, a part of said series of sub-floor flues, next in the course of escaping products to the coking chamber, being situated adjacent to others more remote from said chamber to heat said more remote and relatively cooler flues by conduction through the intermediate walls and thereby quicken the draft therein, substantially as set forth.

2. In a coking oven having a door, floor and covered charging chute, the flue 6 communicating with said chute and with flues 7 and 7' formed by the walls 10 and 11 terminating at the wall of the oven, and partitions 8 and 9 crossing each other and extending to near the said oven wall, said latter flues also communicating with the chimney situated at the side of the flue 6, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ARCHIBALD ROBERT STRACHAN.

Witnesses:

H. A. BROOKING,
FRANK GIBSON.