

(No Model.)

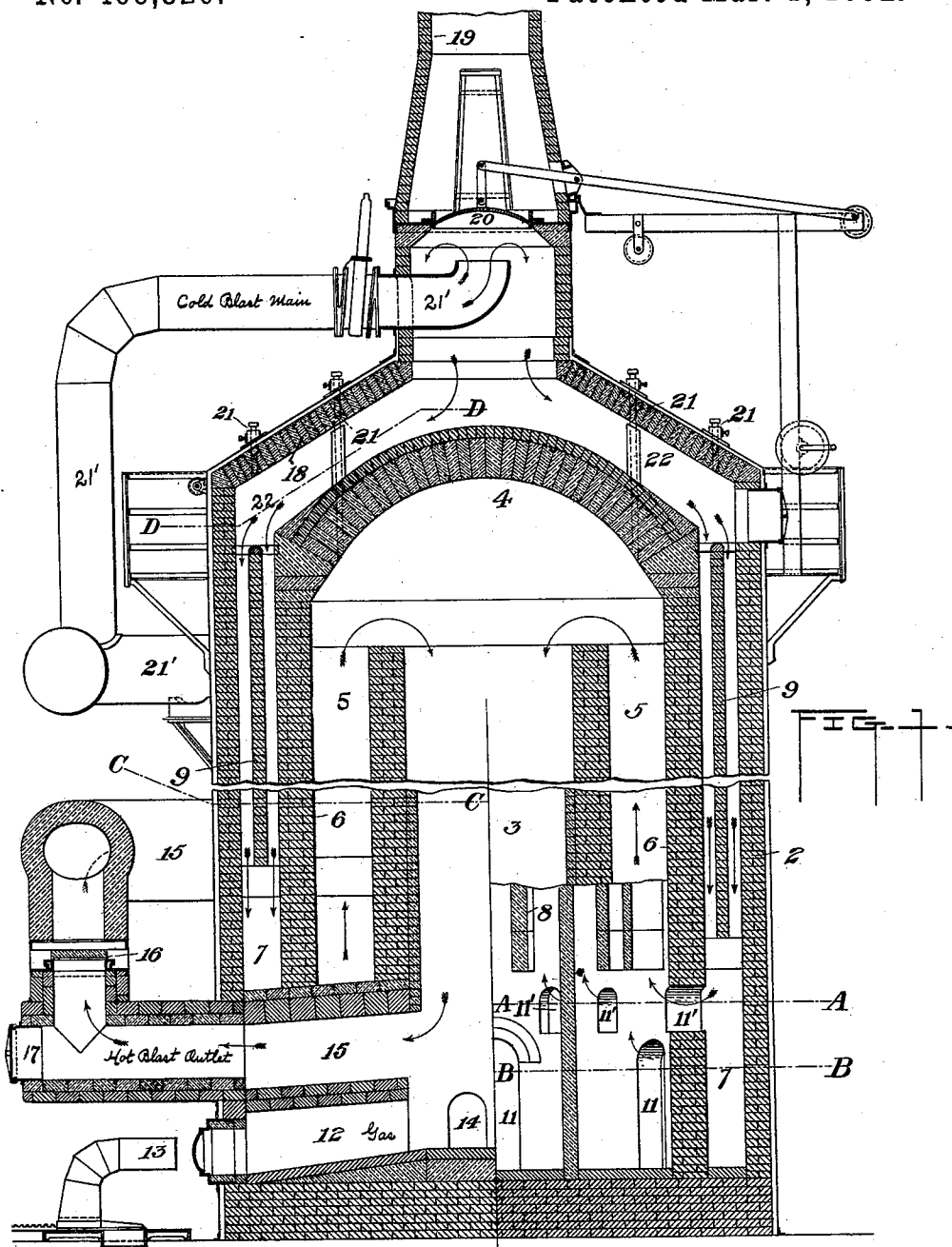
2 Sheets—Sheet 1.

G. W. McCLURE & C. AMSLER.

REGENERATIVE HOT BLAST STOVE.

No. 469,820.

Patented Mar. 1, 1892.



Witnesses

H. L. Gill
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Inventors

George W. McClure
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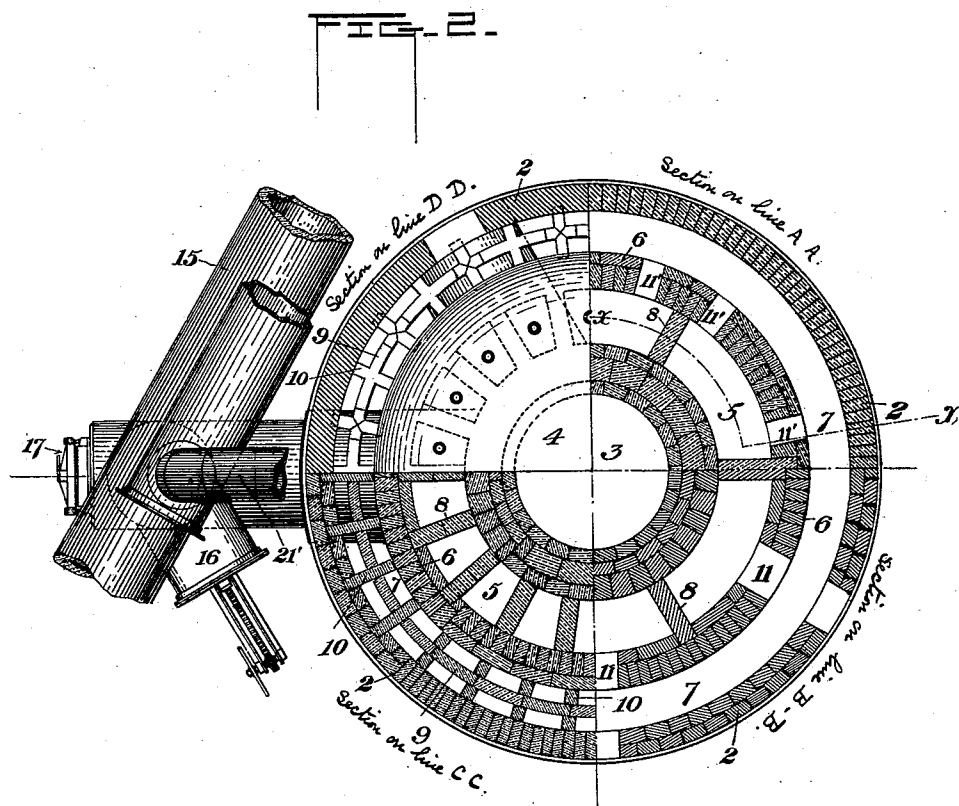
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UNITED STATES PATENT OFFICE.

GEORGE W. MCCLURE AND CARL AMSLER, OF PITTSBURG, PENNSYLVANIA.

REGENERATIVE HOT-BLAST STOVE.

SPECIFICATION forming part of Letters Patent No. 469,820, dated March 1, 1892.

Application filed June 5, 1891. Serial No. 395,246. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. MCCLURE and CARL AMSLER, both of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Regenerative Hot-Blast Stoves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows in vertical central section the upper part or dome and the lower part of our improved hot-blast stove. The part of this figure at the lower right-hand corner is in section on the line *xx* of Fig. 2. Fig. 2 is a horizontal sectional view in four different section planes—viz., on the planes shown by the lines A A, B B, C C, and D D, respectively.

The object of our invention is to provide a stove having at the top a connection between the vertical flues and the stack-flue, so constructed that there shall not be that liability to fracture of the walls by expansion and contraction which has been present in stoves constructed as heretofore. This we effect by constituting the connecting-passage by means of a dome-shell or arch made separate from the crown of the stove and affording an intervening space instead of forming flues in the crown itself.

Our invention also relates to other features of construction of the stove.

Referring now to the drawings, 2 represents the outer cylindrical wall of the stove incased in a suitable jacket. The stove, as shown, is divided into a series of concentric annular flues, though it should be understood that our invention, broadly stated, is not limited to the arrangement of such flues, since the construction of the top of the stove is claimed by us independently. We intend also to claim these features in combination.

3 is the central flue of the stove, the base of which serves as the combustion-chamber, while the upper part terminates below the stove-crown 4 and communicates with an annular flue 5, formed by an outer cylindrical wall 6, which extends from the crown to the stove's base.

7 is an outer flue constituted by the annular space intervening between the walls 6 and 2. The flue 5 is divided into a number of

parts by radial partition-walls 8, which serve to increase the heating-surface of the stove, and the flue 7 is also divided by an annular wall 9 and cross-partitions 10. The flues 5 and 7 are connected by ports 11 at the lower part of the stove. These ports 11 enter the middle of the flues, and in addition thereto there are other connecting-ports 11' at the sides of the ports 11, which insure even flow of the gas to all parts of the flue and prevent unequal distribution of the gas. All the radial walls in the outer flue 7 terminate above the level of the ports, so as afford an open continuous flue-chamber at the base of said flue.

12 is a gas-inlet port opening into the base of the flue 3.

13 is a gas-burner pipe adapted to discharge gas thereinto, and 14 is an air-inlet port through which air is admitted to support combustion of the gas.

15 is the hot-blast main provided with a suitable valve 16 and leading from the base of the flue 3. This main is also provided with an air-port 17 for the inlet of air to assist in combustion of the gas.

18 is a dome or arch which surmounts the outer wall 2 and is separate from the crown of the stove, so as to afford an intermediate flue or passage 22, connecting all the divisions of the outer flue 7 with a central stack-flue 19 for the exit of the products of combustion.

20 is a valve for closing the stack-flue, and 21' is the cold-blast-inlet pipe, which discharges into the stack-flue below said valve and is itself provided with a suitable controlling-valve by which the admission of air may be regulated.

21 21 are holes through which may be drawn chains attached to suitable brushes or scrapers in the flues.

The operation of the stove is as follows: To heat the flues the stack-flue valve 20 is opened, the valve of the hot-blast main is closed, and combustible gas is introduced into the gas-inlet 12. The gas, uniting with air admitted through the air-inlets, burns in the flue 3, ascends through this flue to the crown of the stove, then descends through the several divisions of the annular flue 5, and at the base thereof passes through the ports 11 and 11'

into the outer flue 7 and ascends through the divisions of this flue, and finally passes through the flue 22 to the stack. When the flues have been heated in this manner to a sufficiently high degree, as in ordinary hot-blast stove practice, the gas and air inlets into the base of the flue 3 are closed, the stack-valve 20 is also closed, and the valves of the cold-blast pipe and hot-blast main are opened. The air then enters through the cold-blast main, descends through the flue 22, and passes in succession (and in reverse direction to the above-described course of the gases of combustion) through the flues 7, 5, and 3, in which it is heated by the stored heat of the walls, and finally passes off through the hot-blast main to the furnace, at which it is utilized. When the stove has cooled to such extent that the air is no longer efficiently heated, it is again heated by reversal of the valves in the usual way.

It will be noticed from the foregoing description that the arch 18, being not tied to the inner crown of the stove, is quite free to move vertically with the outer walls in the expansion and contraction caused by variations in temperature of the stove. In this way we overcome what has been a fruitful source of injury to the masonry of the stove structure. Another advantage which results from having the flue 22 continuous, or practically so, instead of employing a series of small individual flues traversing the furnace-crown, is that we secure an even draft from all the divisions of the upright flues and thus improve the stove in respect of evenness of heating and efficiency.

Modifications in the construction of the stove will be suggested to those skilled in the art.

We claim—

1. A hot-blast stove comprising an outer roofed shell, an inner apertured shell having a crown separated from the outer roof, valved passages leading into the inner shell, and valved passages leading from the space be-

tween the roof and crown, substantially as and for the purposes described.

2. A hot-blast stove comprising an outer roofed shell, an inner concentric shell with a crown separated from the outer roof and having apertures in its sides, an open-topped shell within the inner crowned shell, valved passages leading into the innermost shell, and valved passages leading from the space between the roof and crown, substantially as and for the purposes described.

3. A hot-blast stove comprising an outer roofed shell, an inner shell having a crown, a series of apertures in the lower part of the inner shell, a higher series of apertures alternating therewith, valved passages leading into the inner shell, and valved passages leading from the space between the roof and crown, substantially as and for the purposes described.

4. A hot-blast stove comprising an outer roofed shell, an inner apertured shell having a crown separated from the outer roof, partitions in the flue between the shells and terminating above the apertures, valved passages leading into the inner shell, and valved passages leading from the space between the roof and crown, substantially as and for the purposes described.

5. A hot-blast stove comprising an outer roofed shell, a valved stack-flue leading therefrom, an inner concentric shell having a separate crown, apertures in the wall of the inner shell, a combustion-chamber within the inner shell, a hot-blast outlet, an inlet for fuel leading thereto, and a cold-blast outlet terminating in the space between the crown and roof, substantially as and for the purposes described.

In testimony whereof we have hereunto set our hands this 29th day of May, A. D. 1891.

GEORGE W. MCCLURE.
CARL AMSLER.

Witnesses:

H. M. CORWIN,
THOMAS W. BAKEWELL.