

(No Model.)

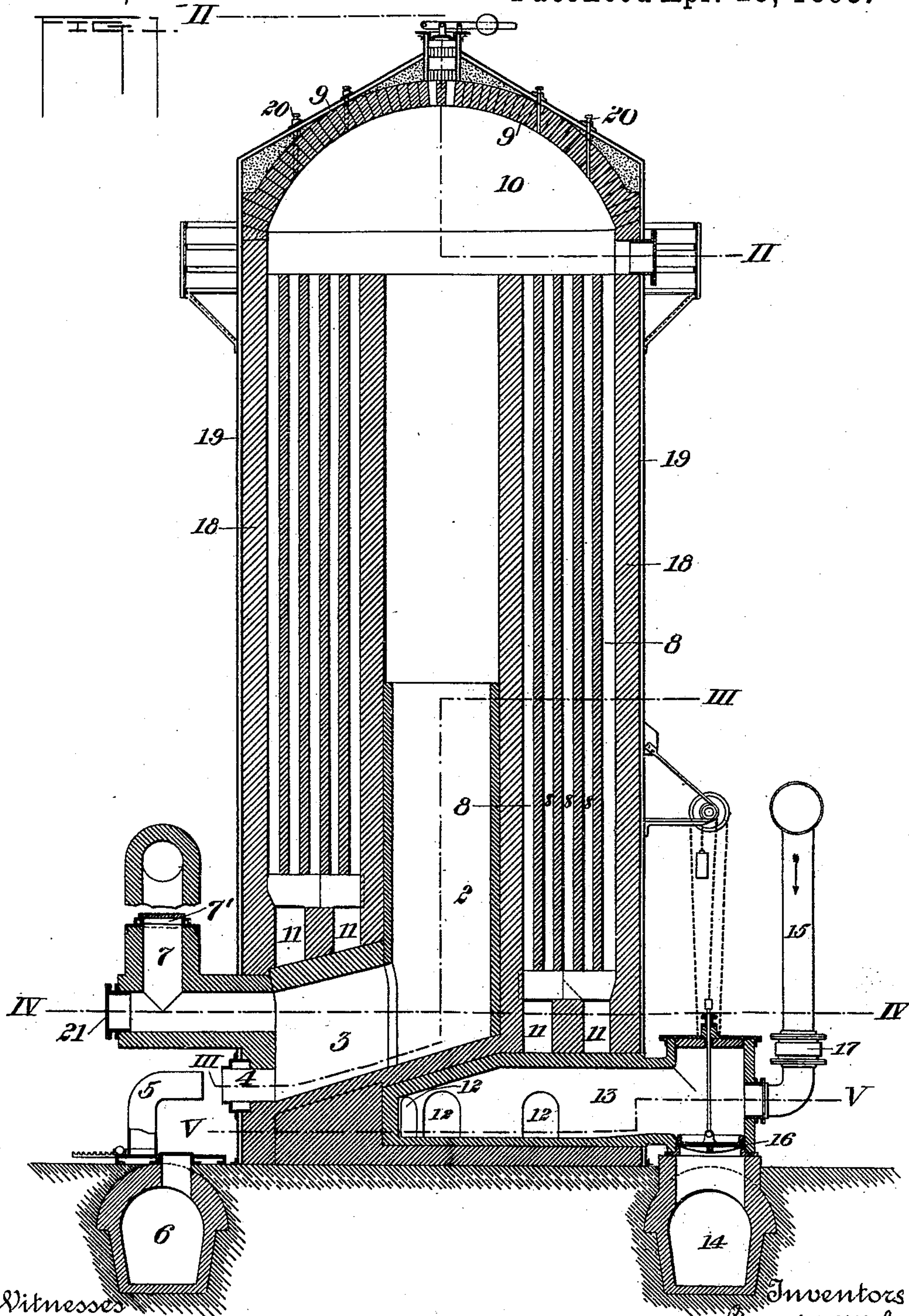
3 Sheets—Sheet 1.

G. W. McCLURE & C. AMSLER.

HOT BLAST STOVE.

No. 496,092.

Patented Apr. 25, 1893.



Witnesses
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3 Sheets—Sheet 2.

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FIG. 2.

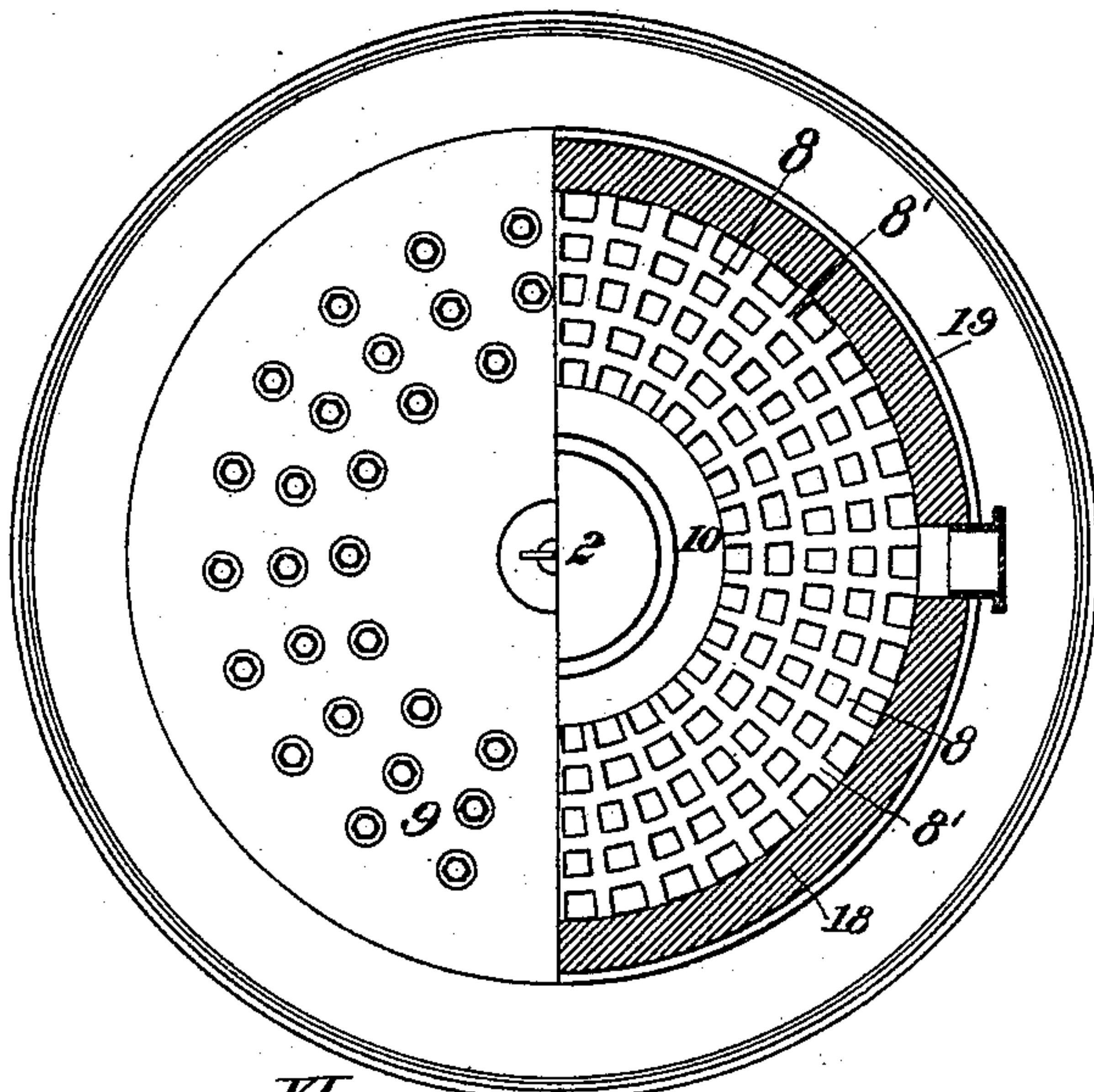


FIG. 3.

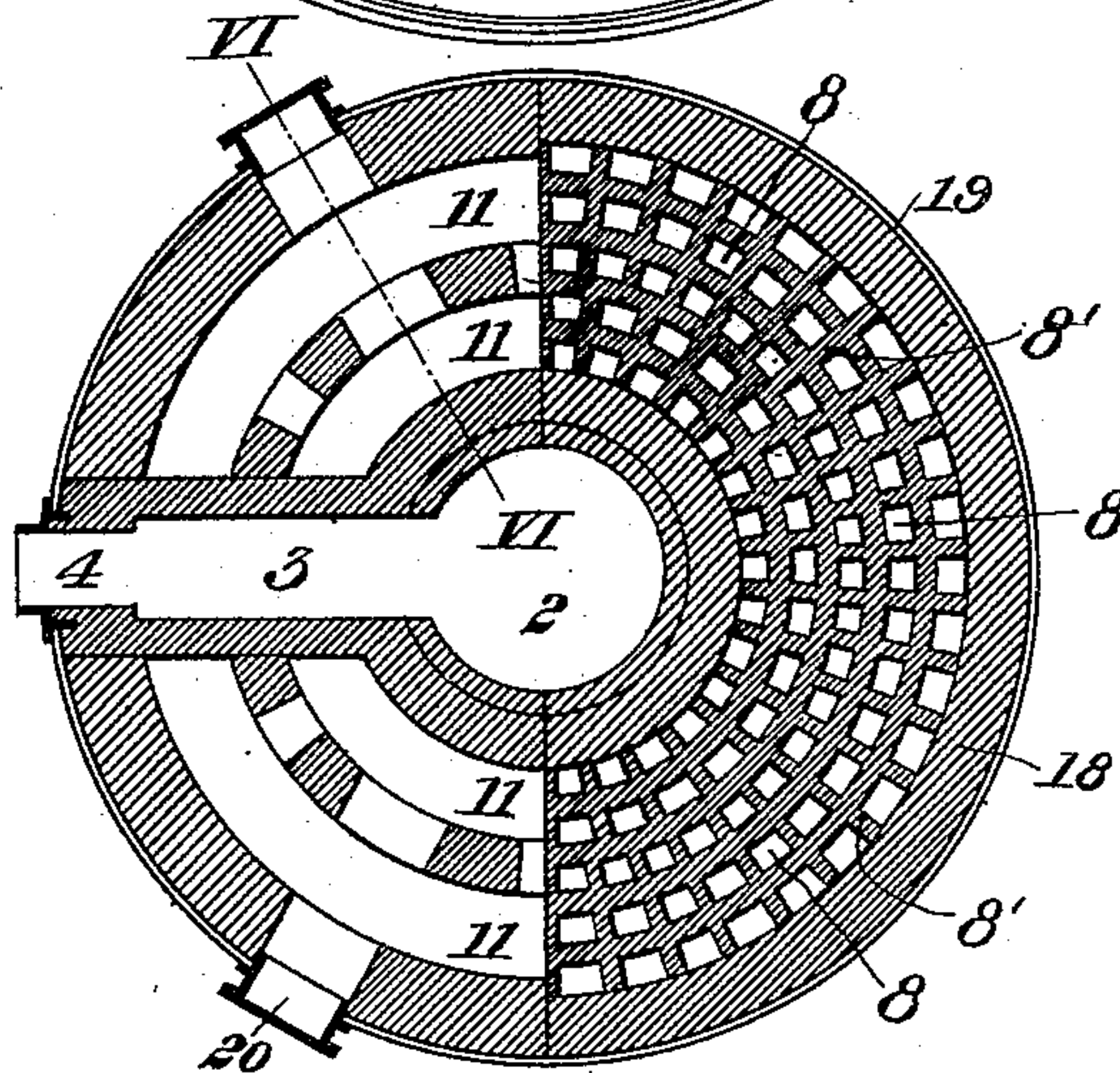
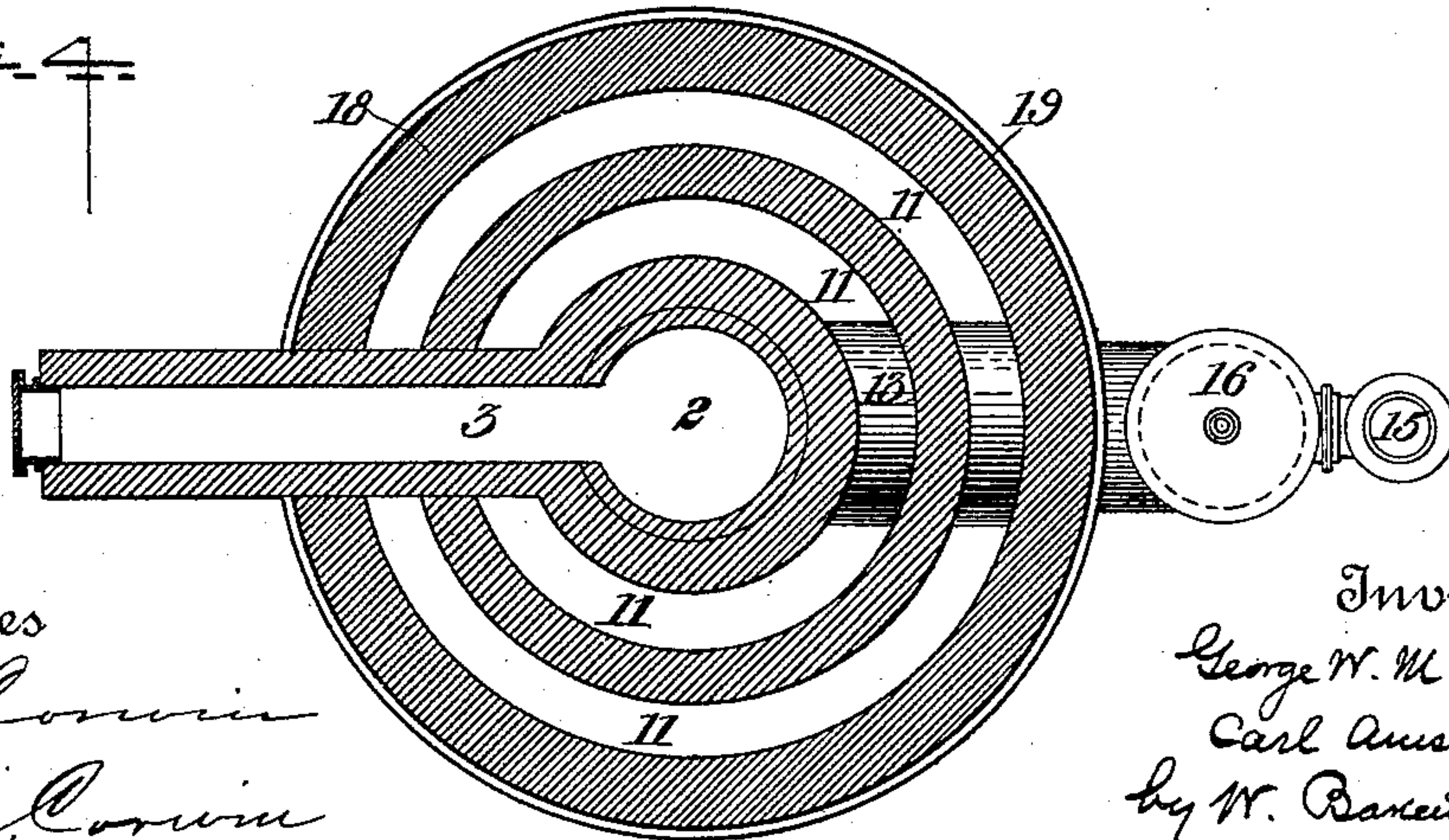


FIG. 4.



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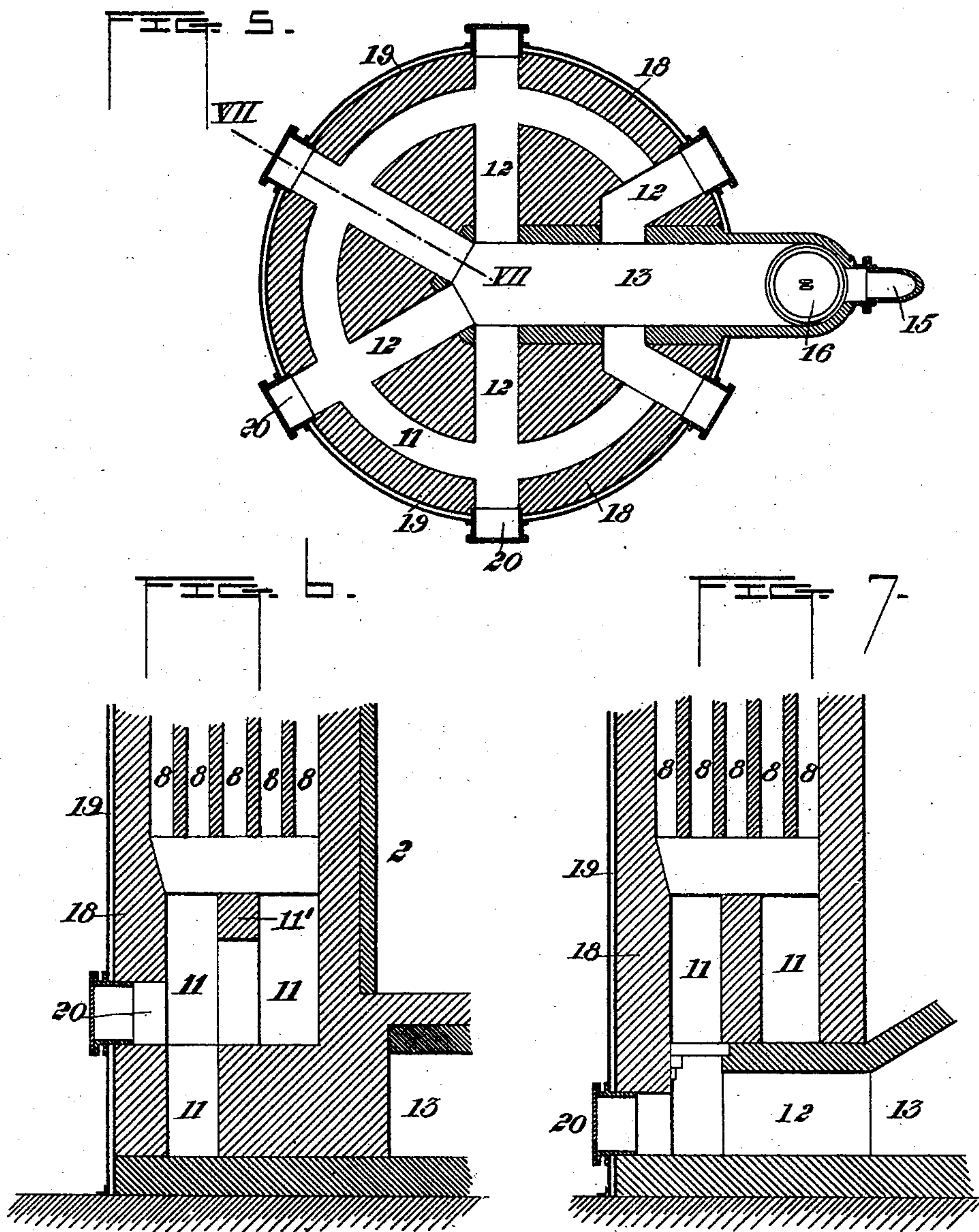
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UNITED STATES PATENT OFFICE.

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

HOT-BLAST STOVE.

SPECIFICATION forming part of Letters Patent No. 496,092, dated April 25, 1893.

Application filed December 26, 1891. Serial No. 416,171. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. MCCLURE and CARL AMSLER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have
5 invented a new and useful Improvement in 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—

10 Figure 1 is a vertical central section of our improved hot-blast stove. Fig. 2 is a sectional plan view on the line II—II of Fig. 1. Fig. 3 is an irregular horizontal section on the line III—III of Fig. 1. Fig. 4 is a horizontal
15 section on the line IV—IV of Fig. 1. Fig. 5 is a horizontal section on the line V—V of Fig. 1; and Figs. 6 and 7 are vertical sections on the lines VI—VI and VII—VII of Figs. 3 and 5 respectively.

20 The object of our invention is to provide a hot-blast stove of improved construction having two passes for the gas and air. The combustion-chamber, which also forms one of the passes, is in the center of the stove and the
25 second pass is constituted by surrounding annular vertical flues. The cold-blast inlet and the hot-blast outlet are at the base of the stove.

In the drawings, 2 is the combustion-chamber consisting of a vertical flue at the center
30 of the stove extending from the bottom to the top thereof; 3 is a transverse flue at the base of the stove communicating with the flue 2 and provided with an inlet 4 into which gas
35 may be introduced through a burner-pipe 5 from a gas-flue 6. The flue 3 also communicates with a valve-controlled conduit 7 which leads to the blast furnace or other metallurgical apparatus at which the heated air blast is
40 to be utilized.

As shown in the figures on the second sheet of the drawings, the stove is formed with cylindrical vertical walls 8 surrounding the central flue 2 and forming a series of annular
45 flues. These walls, together with the wall of the flue 2, terminate below the dome 9 of the stove so that all the flues are connected by the chamber 10 beneath said dome. The flues 8 may be provided with radial cross-bricks or
50 partitions 8' designed to increase the area of exposed heating surface and at their bases

they merge into a circular flue 11, which communicates through horizontal cross-flues 12 with a horizontal flue 13 (Figs. 5, 6 and 7) situate at the base of the stove and communicating with the stack-flue 14 and with the
55 pipe 15 leading from the cold-blast main.

11' represents a series of laterally perforated or separated vertical bricks set in the upper portion of the flue 11, and serving to
60 uphold the upper fire-brick structure.

16 is the valve controlling the stack-flue.

7' is the valve controlling the hot-blast pipe 7, and 17 is the valve controlling the air pipe.

18 is the outer cylindrical wall of the stove
65 incased by the usual metallic jacket 19, and cleaning holes 20 are provided for getting access to the several flues.

The operation is as follows:—In order to heat the stove we shut the valves 7' and 17
70 and open the valve 16. We then admit gas and air into the pipe 4 and air also through a valve-controlled opening 21 in the pipe 7, which gas and air burn in the combustion-flue 2, arise through said flue to the top of
75 the stove and thence descend through the flues 8 around the combustion-flue and through the flues 11, 12 and 13 to the stack-flue 14. By reason of the fact that the vertical annular flues communicate directly at their bases
80 with the circular flue 11, from which direct cross flues 12 lead to the flue 13, the down draft through all parts of the flue can be made uniform by regulating the top or bottom openings of the flues, having those near-
85 est the stack end of the stove somewhat the smallest. Without this circular flue and cross flues this result is not attainable, and it is in the combination of these parts with concentric vertical annular flues that our in-
90 vention consists. It will be noticed in the drawings we show the flue 11 wider at the upper part than it is at the lower level of the cross-flues, being at the upper part coextensive in width with the vertical flues.

95 This construction is desirable and is claimed by us specifically, though the broader claim is not limited thereto. The advantage is that we thus afford easy access and communication from the flue 11 to the vertical flues, improving the uniformity of draft and rendering the flues easy to clean. The stove is thus
100

uniformly heated throughout and is not apt to be injured by unequal expansion of one side more than another. When the flues have been heated sufficiently, the valve 16 and the valve of the pipe 4 are closed, the valve 17 is then opened and cold air blast is introduced through the pipe 15, passes through the flue 13 and radial flues 12, by which it is equally distributed to all the parts of the annular flue 11, and rises through the flues 8 to the chamber 10, and thence down through the flue 2 into the flue 3 and through the pipe 7 to the furnace. The air is heated in its passage, and by reason of the arrangement of the flues abstracts therefrom a maximum of heat from all parts of the stove equally.

The advantages of our invention will be appreciated by those skilled in the art. The stove is simple and by reason of its concentric arrangement is extremely durable, is not liable to be injured by expansion and contraction of the walls, and it affords a most efficient means for heating the air. In former two-pass stoves, such as the Cowper stove where the flues are on different sides of the structure, the draft is unequal, the heat is unevenly distributed, certain parts of the stove which do not receive the full current of gas do not perform their full share of work and serve as dust-catchers, while other parts do the greatest heating. The dust is a non conductor of heat, and when the flues are clogged they impair the heating capacity of the stove. In our stove the products of combustion and the cold air are distributed to and pass equally through all parts of the stove because the draft in all the flues is equal, so that it acts uniformly and is therefore more efficient and

economical and is kept more easily in working order.

We claim—

1. A hot-blast stove having a central combustion flue and surrounding vertical flues communicating therewith at the top, a separate annular flue beneath the said vertical flues and connecting therewith, a gas inlet and hot-blast outlet at the base of the central flue, a cold-blast inlet, a stack flue, and cross-flues substantially on a level with and directly connecting the annular flue with the blast inlet and stack flues; substantially as and for the purposes described.

2. A hot-blast stove having a central flue in which combustion is effected, and surrounding vertical flues communicating at the top with said central flue, a gas-inlet and hot-blast outlet at the base of the central flue, a cold-blast inlet, a stack-flue, a circular flue at the base of the stove into which the vertical flues open, and cross-flues at the base directly connecting the circular flue with the blast-inlet and stack-flues, said circular flue extending vertically above the level of the cross-flues, and being at its upper part coextensive in width with the vertical flues, and wider than it is at the level of the cross-flues; substantially as and for the purposes described.

In testimony whereof we have hereunto set our hands this 9th day of December, A. D. 1891.

GEO. W. McCLURE.
CARL AMSLER.

Witnesses;

THOMAS W. BAKEWELL,
W. B. CORWIN.