(No Model.) 3 Sheets—Sheet 1.

G. W. McCLURE.

HOT BLAST STOVE.

No. 574,041. Patented Dec. 29, 1896.

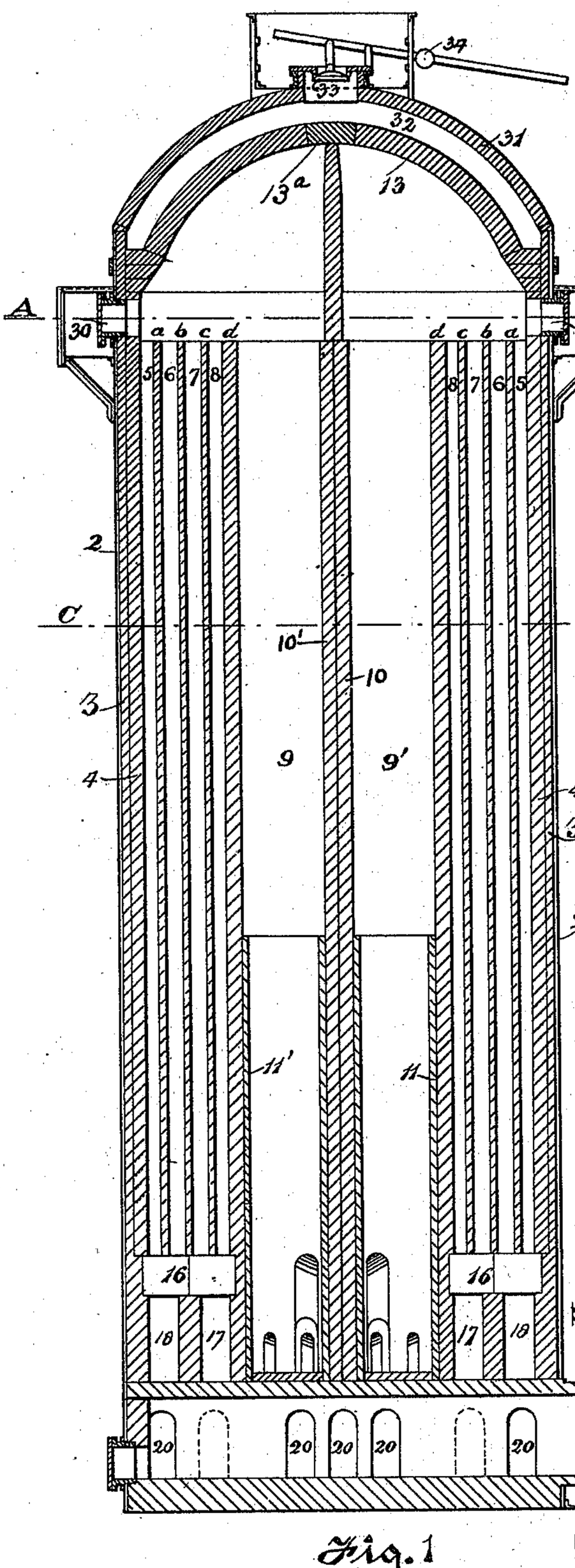

Fig. 1

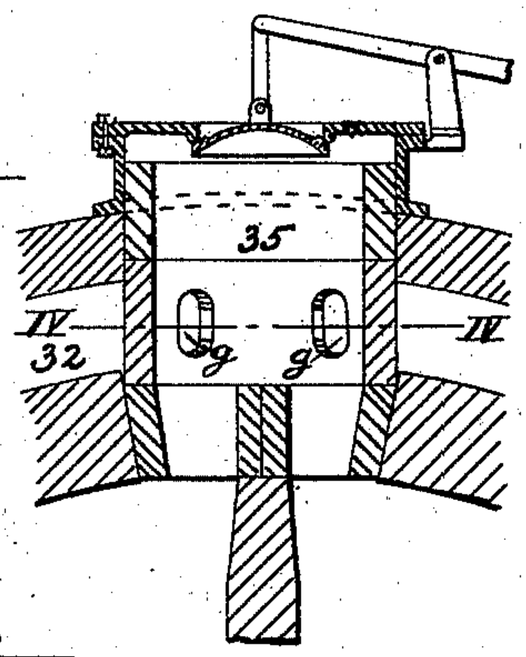

Fig. 3

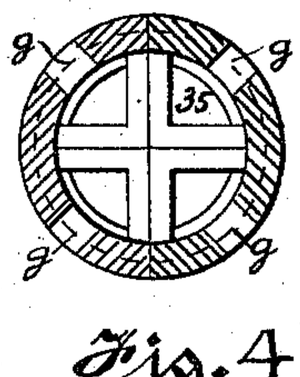

Fig. 4

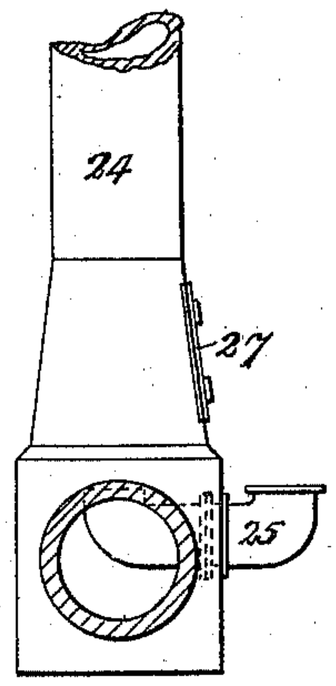

Fig. 2

Witnesses
M. W. Barkey.
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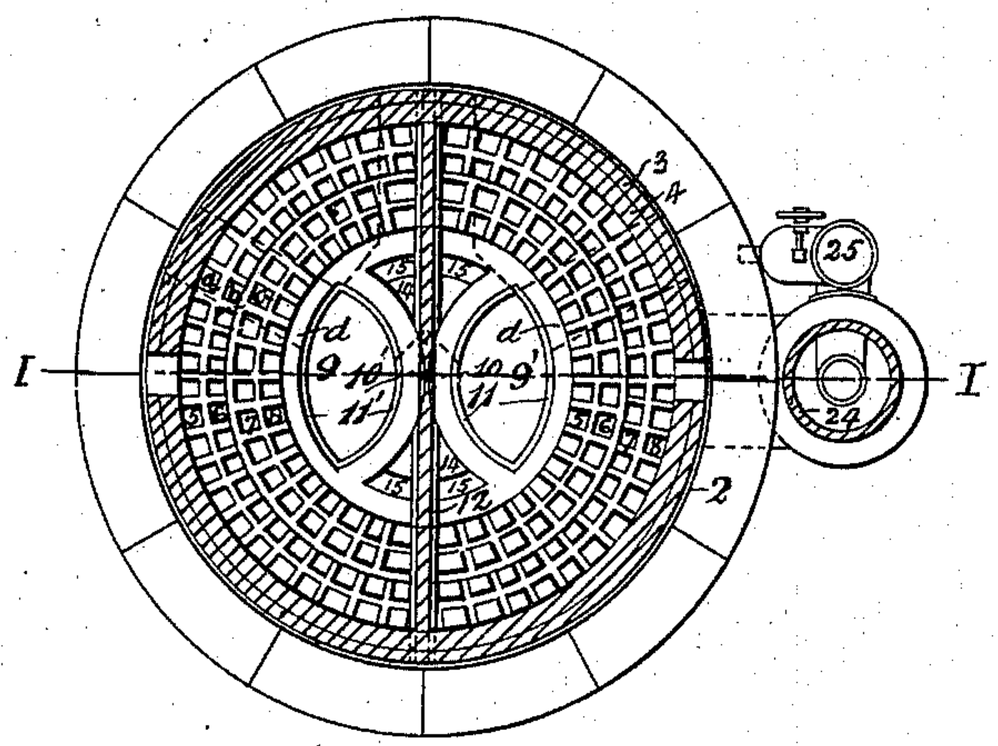
(No Model.)

3 Sheets—Sheet 2.

G. W. McCLURE.

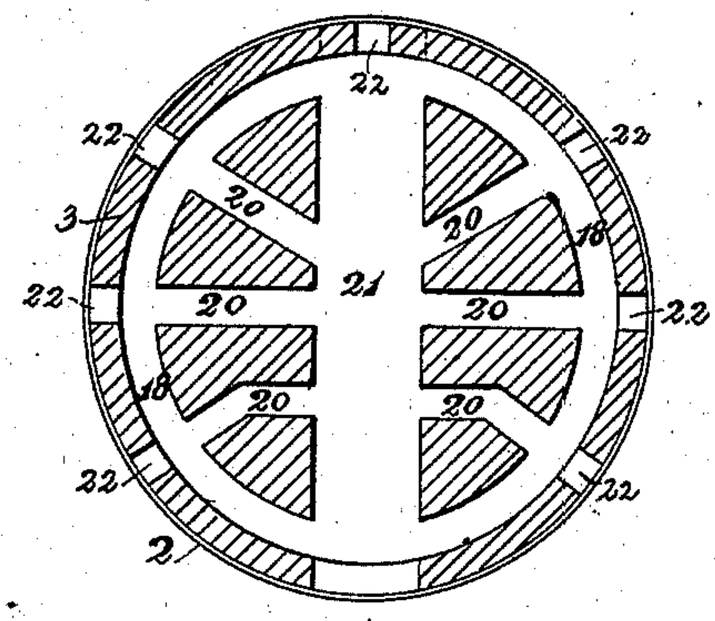
HOT BLAST STOVE.

No. 574,041. Patented Dec. 29, 1896.



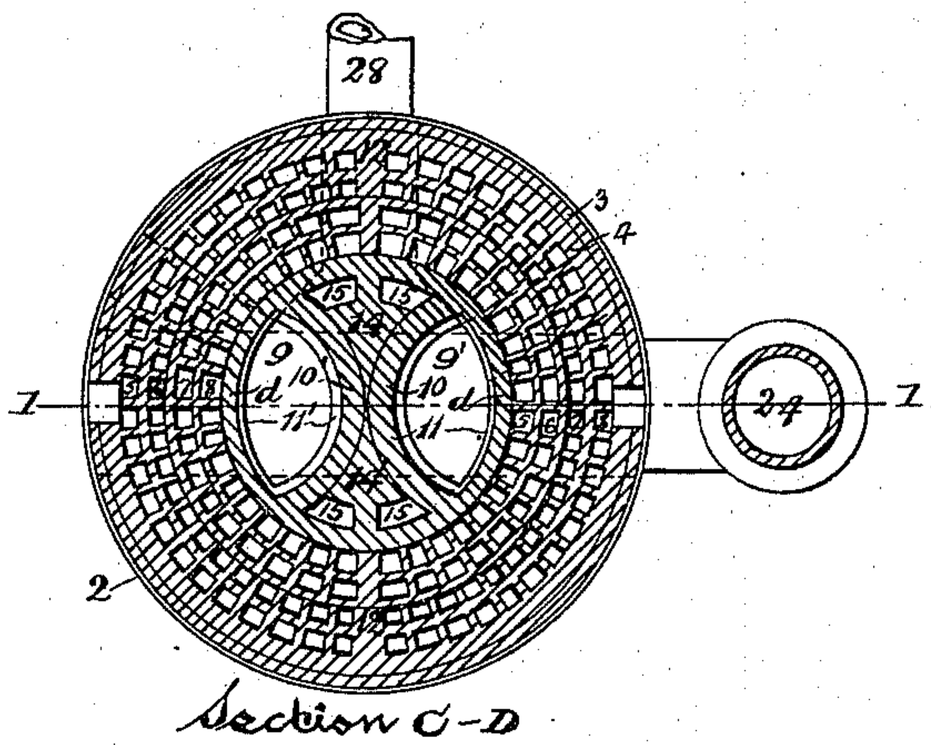
Section a-B

Fig. 5



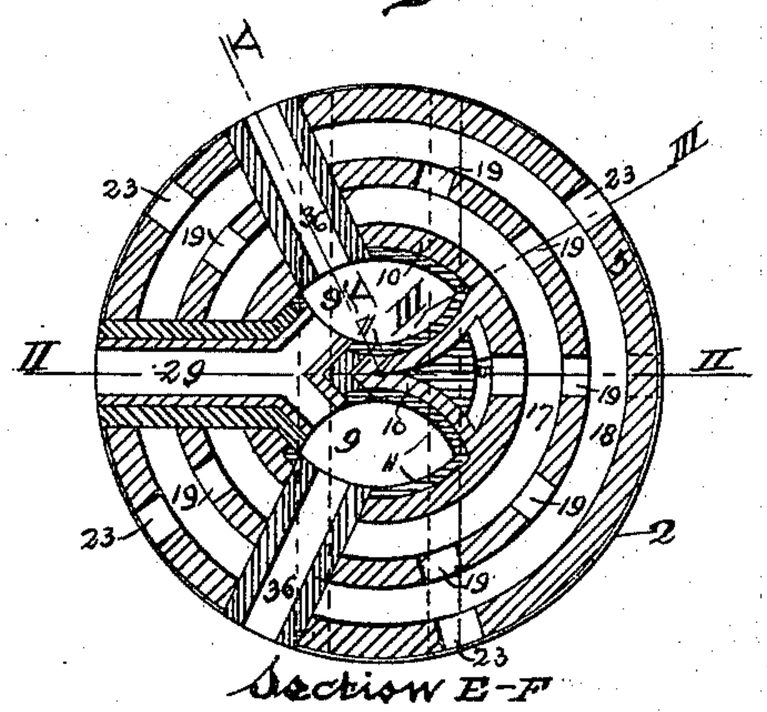
Section G-H

Fig. 8



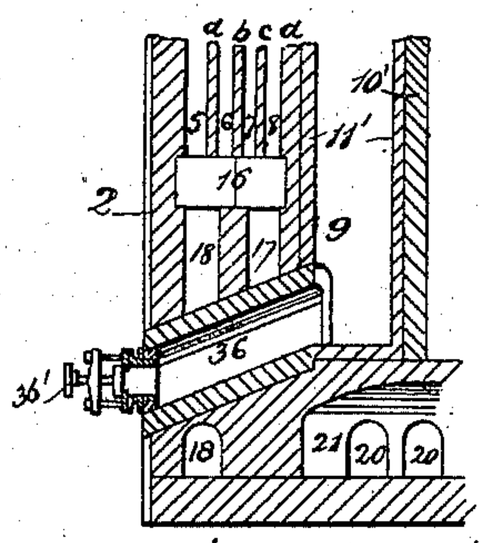
Section C-D

Fig. 6



Section E-F

Fig 7



Section V-V

Fig. 9.

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(No Model.) 3 Sheets—Sheet 3.

G. W. McCLURE.

HOT BLAST STOVE.

No. 574,041. Patented Dec. 29, 1896.

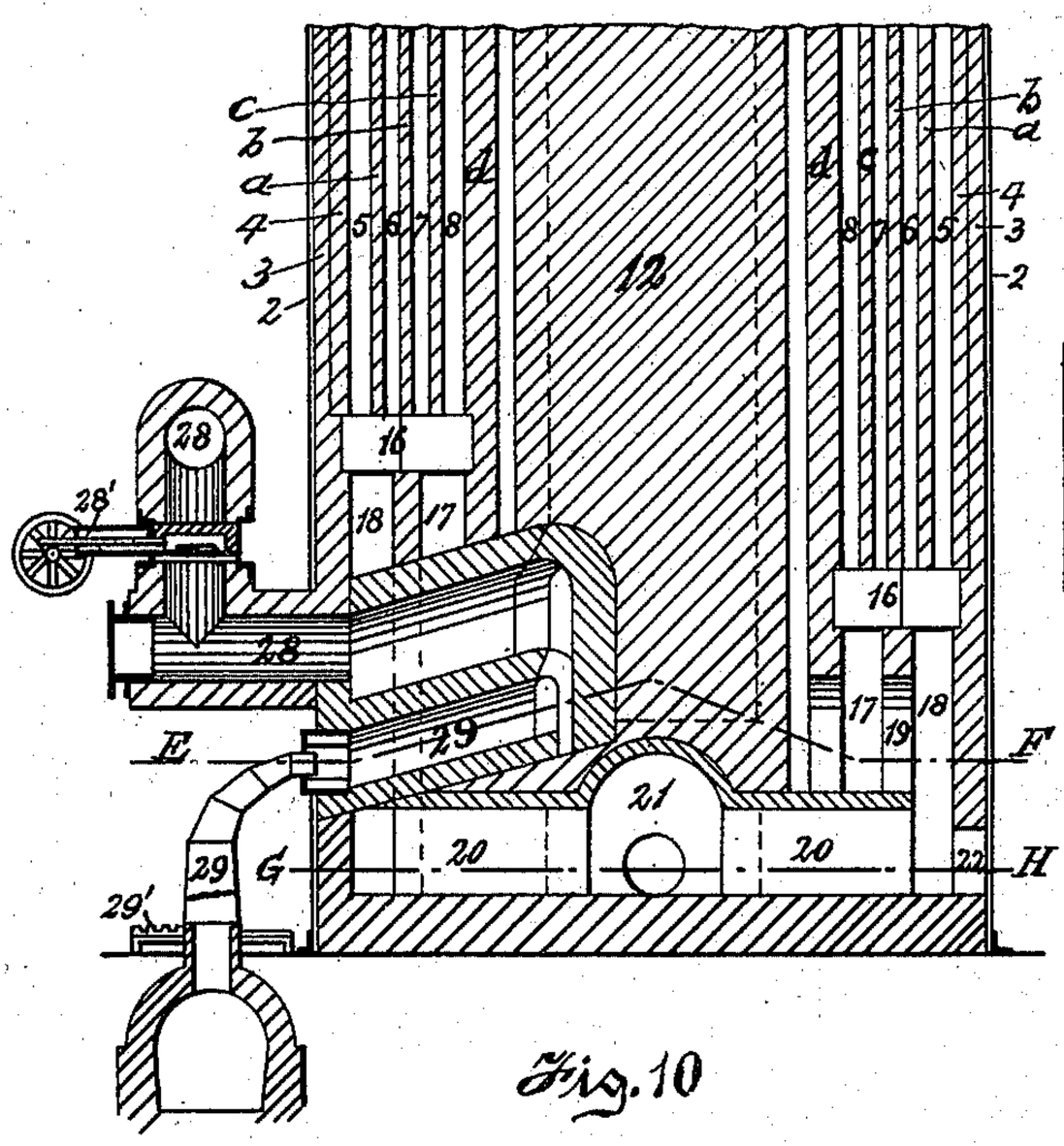


Fig. 10

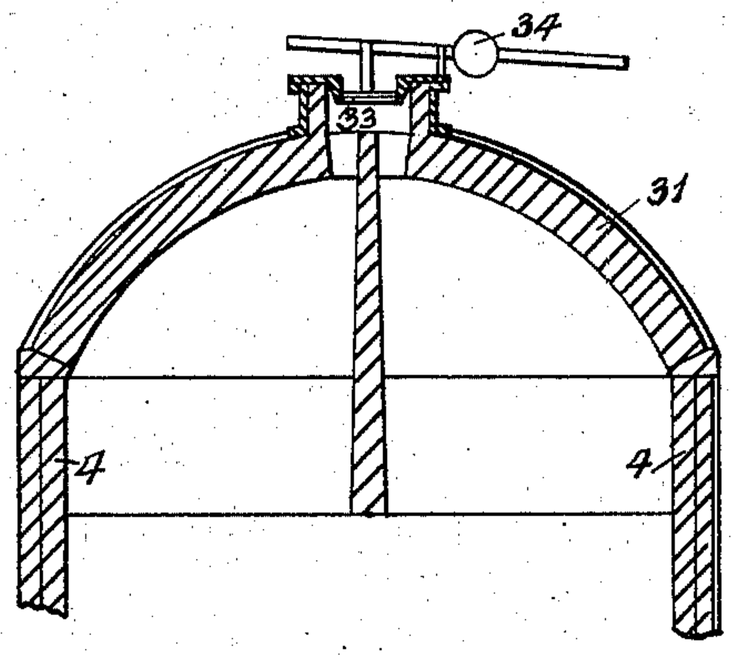


Fig. 11

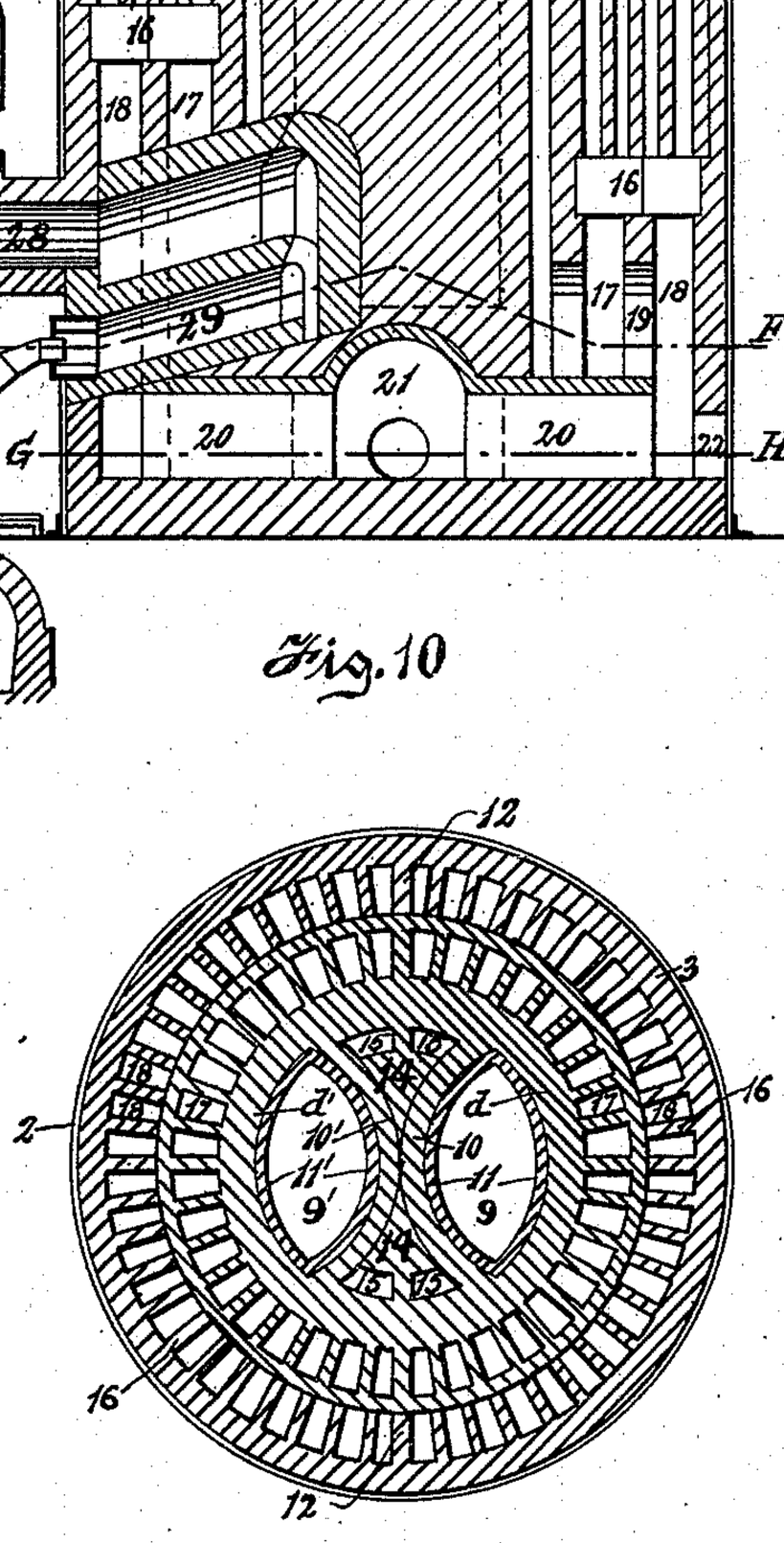
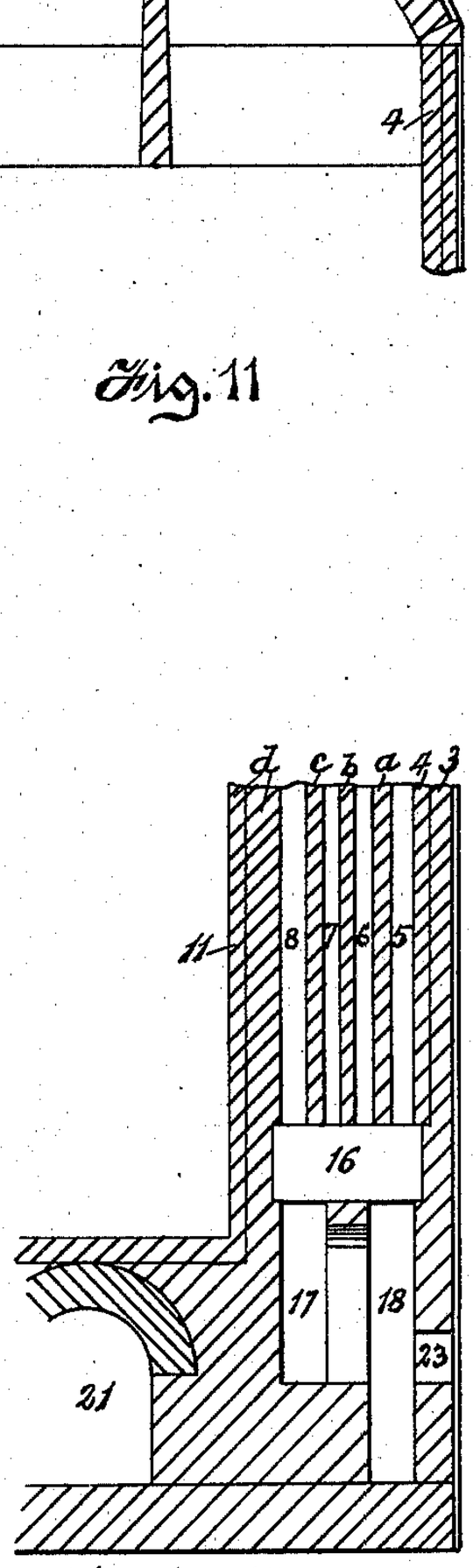


Fig. 14.



Section III - III

Fig. 12

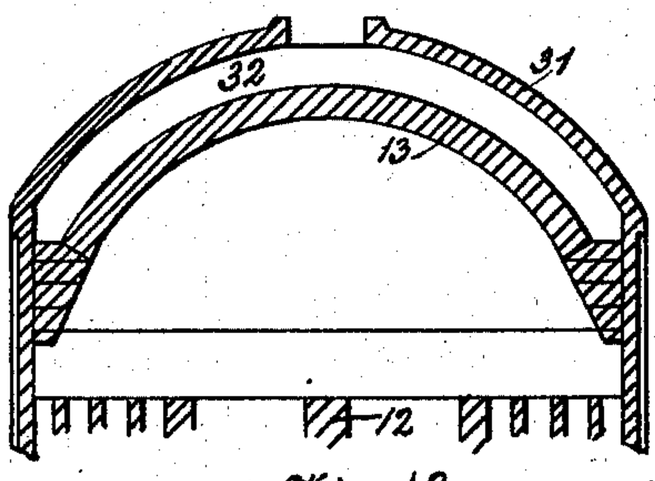


Fig. 13

Witnesses
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M. W. Caskey.

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George W. McClure
by Wm. L. Peirce,
his Attorney

UNITED STATES PATENT OFFICE.

GEORGE WASHINGTON McCLURE, OF PITTSBURG, PENNSYLVANIA.

HOT-BLAST STOVE.

SPECIFICATION forming part of Letters Patent No. 574,041, dated December 29, 1896.

Application filed October 17, 1895. Serial No. 565,933. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WASHINGTON McCLURE, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Hot-Blast Stoves, of which the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a vertical central section on line I I of Fig. 5. Fig. 2 is a section on line II II of Fig. 1. Fig. 3 is a central vertical section of the top of a modified form of stove. Fig. 4 is a section on line IV IV of Fig. 3. Fig. 5 is a section on line A B of Fig. 1. Fig. 6 is a section on line C D of Fig. 1. Fig. 7 is a section on line E F of Fig. 11. Fig. 8 is a section on line G H of Fig. 11. Fig. 9 is a section on line V V of Fig. 7. Fig. 10 is a section on line II II of Fig. 7. Fig. 11 is a central vertical section of top of stove, showing inner dome omitted. Fig. 12 is a section on line III III of Fig. 7. Fig. 13 is a central vertical section of the top of a modified stove, showing middle wall omitted above the level of the top of the annular flues. Fig. 14 is a horizontal section through flue 16 of Fig. 1.

My invention, generally stated, relates to improvements in the construction of two-pass fire-brick hot-blast stoves; and it consists in certain novel features more specifically described hereinafter and particularized in the claims.

In the accompanying drawings, which make part of this specification, 2 indicates the usual metal jacket of the stove. 3 is the shell of the stove, and 4 the lining of the same.

a b c d are four annular walls extending from near the top of the stove to near the bottom of the same, and 5, 6, 7, and 8 the four annular flues cut in two by a central wall. As seen in Figs. 5 and 6, these flues are not bonded into the lining of the stove, and flues 5 and 6 are built also independently of 7 and 8.

The annular wall *d*, extending from the top level of the flues to the top of the stack-flue, forms the outer wall for combustion-chambers 9 9′ and also is not bonded into the flues. Springing from the inside of said wall *d* are the arc-shaped walls 10 10′, which form inner walls for combustion-chambers which have usual reinforcing-walls 11 11′.

12 is a central dividing-wall which extends from the inner dome 13 to the top of chimney-flue. It is expanded into wedge-shaped walls 14 14′, where it meets the arc-walls 10 10′, and its central portion from the stack-flue to top of combustion-chambers is formed by the abutting of the two arc-shaped walls 10 10′ against each other, but above the combustion-chambers it extends across the stove independently of said arc-shaped walls. Space is here left for four additional flues 15 15.

The dome 13 is not bonded into the walls of the shell and is capable of a vertical movement in expanding and contracting.

13ª is the keystone of the arch of the dome 13.

Girders are set on edge and support the flue structure and run around the stove, changing their levels, however, to pass above the hot-blast inlet-flue and constituting a horizontal annular flue 16, with which the vertical flues 5, 6, 7, 8, and 15 communicate.

From flue 16 drop the two vertical annular flues 17 18, the inner extending to the level of the top of the stack-flue and the outer to the base of the stove. Communication is made between 17 and 18 by openings 19 19 through the wall-dividing flues 17 and 18, and flue 18 communicates with the stack-flue 21 through radial flues 20 20. (Seen in Fig. 8.) Opposite said radial flues are cleaning-doors 22 22, and opposite the openings 19 19 are cleaning-doors 23 23.

24 is the stack, having cold-blast inlet 25, said stack-outlet being controlled by valve 26, access to which is obtained by door 27.

28 is the hot-blast inlet, controlled by valve 28′, and 29 the gas-inlet, controlled by valve 29′.

36 36 are air-inlets controlled by valves 36′.

30 30 are cleaning-doors at the top of the stove.

31 is the roof of the stove, leaving space 32 between inner dome 13 and itself. In said crown or roof is seated outwardly-closing valve 33, the weight of which is not quite balanced by counterweight 34.

In Fig. 13 is shown a modification where

the middle dividing-wall is omitted above the top level of the vertical flues, converting the double stove into a single stove.

In Figs. 3 and 4 another modification is shown, where an air-inlet 35 is provided in the top of the stove, having openings *g g* into space 32.

In operation when the first-described construction is on gas the hot-blast valve 28′ and the cold-blast valve are closed and the gas-valve 29′ and air-valves 36′ opened. Gas is supplied to both combustion-chambers by the common gas-inlet 29 and air by the two air-inlets 36 36. The gas and air burn in the combustion-chambers 9 and 9′, ascending said chambers separately and then being evenly and uniformly distributed in each half and drawn down flues 5, 6, 7, and 8 and flues 15 15 to the halves of horizontal annular flue 16, then to vertical flues 17 and 18, thence by flue 18 to radial flues 20 20, which lead to stack-flue 21 and to stack 24. By this arrangement two independent stoves are secured and irregularity of draft is practically impossible. When the stove is sufficiently heated, the stack, gas, and air inlets are cut off and the cold blast turned on and the hot-blast valve opened, the cold blast making a retraverse directly opposite to the path just described. Meantime valve 33 has been dropped, permitting cool air to enter and circulate beneath the roof 31, thus avoiding overheating thereof. Should the blast leak through the dome 13 to any great extent, the pressure will seat valve 33 and prevent loss of heat. In the construction, however, shown in Figs. 3 and 4 additional air is supplied to that portion of the stove immediately below the inner dome and combustion thereby quickened there by the introduction of air through valve 33 and air-passage 35. While this air is thus being sucked into the stove proper by the chimney draft at the same time the heated air accumulated between the roof and the false roof of the stove is sucked out of the intermediate space between said two roofs through the openings *g g*, which openings are most clearly seen in Fig. 4. The air thus withdrawn from said roof-space passes down into the body of the stove. When the blast is on, valve 33 will be seated automatically.

A very efficient form of stove, although not equal to the one first described, is illustrated in Fig. 13, where by omitting the upper part of the middle separating-wall the combined burning gases from both combustion-chambers enter a common space beneath the dome and are distributed indifferently right and left to the vertical flues, while the independency of the two combustion-chambers proper and of the two halves of the vertical flues is still maintained.

The combustion-chambers need not be necessarily segmental in cross-section, but may be circular.

In Fig. 11 I show how air may be supplied through the top of the stove to reinforce the bottom air-inlets and where the inner dome of the stove is omitted but the dividing central wall retained.

The great freedom of movement of the parts of the stove among themselves and the facility for repairs, &c., resulting from my style of construction will be apparent to those skilled in the art.

Having described my invention, I claim—

1. In hot-blast stoves, the combination of a shell inclosing the combustion-chamber, flues, &c.; a vertical cross-wall dividing said shell into substantially two equal parts and extending down to the stack-flue; an independent combustion-chamber and semicircular vertical flues on each side of the wall; a stack-flue in the base of the stove and connections between the combustion-chambers and their respective vertical flues and between the said vertical flues and the smoke-stack.

2. In hot-blast stoves, the combination of a shell; a false roof or dome leaving an air-space between itself and the roof proper and permanent opening through the false roof into the stove whereby additional air may be supplied to the upper portion of the stove to quicken the combustion there.

3. In hot-blast stoves the combination of a shell, a lining for said shell; two sets of semicircular vertical flues built within but independent of said lining; two sets of inner semicircular flues built within the first sets but independent thereof and an annular wall inclosing the combustion-chambers built within but independent of said inner sets of vertical flues.

4. In hot-blast stoves the combination of a shell inclosing the combustion-chambers, flues, &c., a vertical cross-wall dividing said shell into substantially two equal parts and extending down to the stack-flue; an independent combustion-chamber and semicircular vertical flues on each side of the said wall; a stack-flue in the base of the stove; a common gas-inlet to said two combustion-chambers and an air-inlet to each of said chambers and connections between the combustion-chambers and their respective vertical flues and between said vertical flues and the smoke-stack.

5. In hot-blast stoves, the combination of a shell; a central vertical dividing-wall; an annular wall in the center of said shell forming the outer wall of two combustion-chambers and a pair of arc-shaped walls sprung from the interior of said annular wall and constituting the inner walls for said two combustion-chambers.

6. In hot-blast stoves, the combination of a shell; a central dividing vertical wall and a series of semicircular vertical flue-walls wedged between the two ends and on each side of said central dividing vertical wall.

7. In hot-blast stoves, the combination of a

shell; a dividing vertical wall within said shell; an independent combustion-chamber and semicircular vertical flues on each side of said wall; semicircular horizontal flues communicating with the bottom of said semicircular vertical flues; vertical semicircular flues communicating with and beneath said horizontal semicircular flues; a second exterior vertical annular flue connecting with said last vertical semicircular flues; a stack-flue and radial flues connecting the stack-flue with said exterior vertical flue.

8. In hot-blast stoves, the combination of a shell inclosing the combustion-chambers, flues, &c.; a vertical cross-wall dividing said shell into substantially two equal parts and extending from the level of the top of the semicircular vertical flues down to the stack-flue; an independent combustion-chamber and semicircular vertical flues on each side of said wall; a stack-flue in the base of said stove and connections between the combustion-chambers and their respective vertical flues and between said vertical flues and the smoke-stack.

In testimony whereof I have hereunto set my hand this 15th day of October, A. D. 1895.

GEORGE WASHINGTON McCLURE.

Witnesses:
WM. L. PIERCE,
LUCY DORSEY IAMS.