

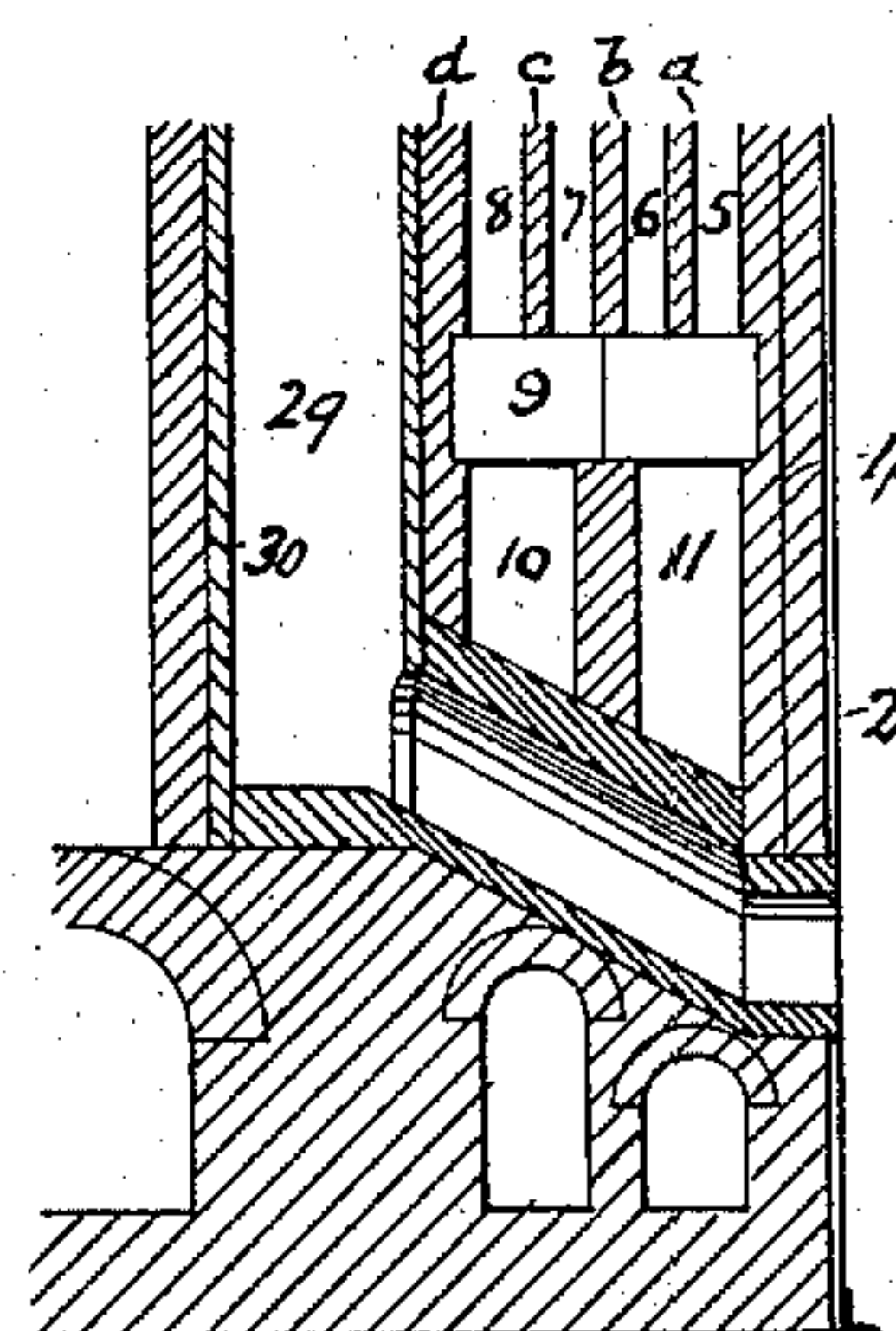
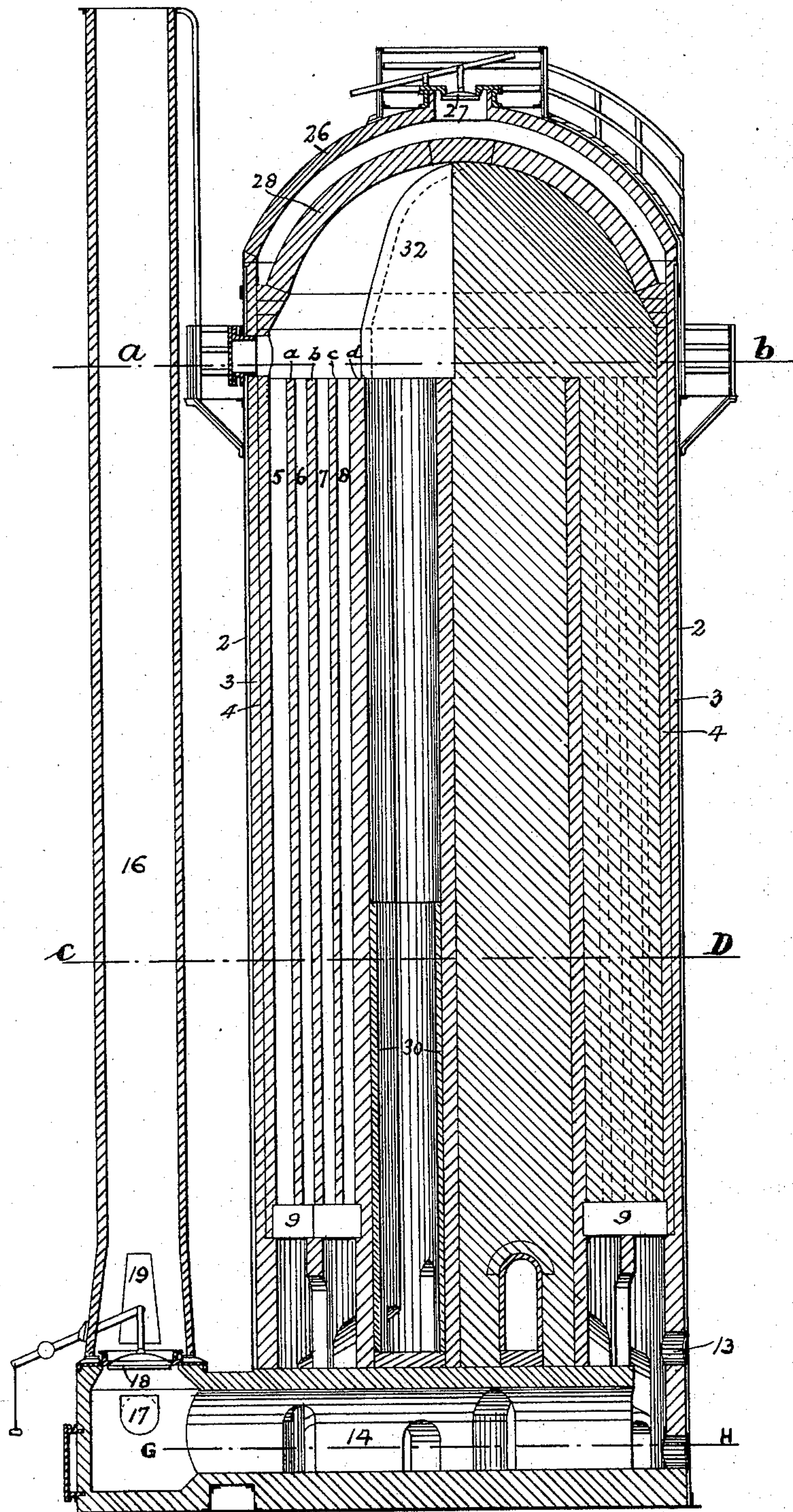
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3 Sheets—Sheet 1

G. W. McCLURE.  
HOT BLAST STOVE.

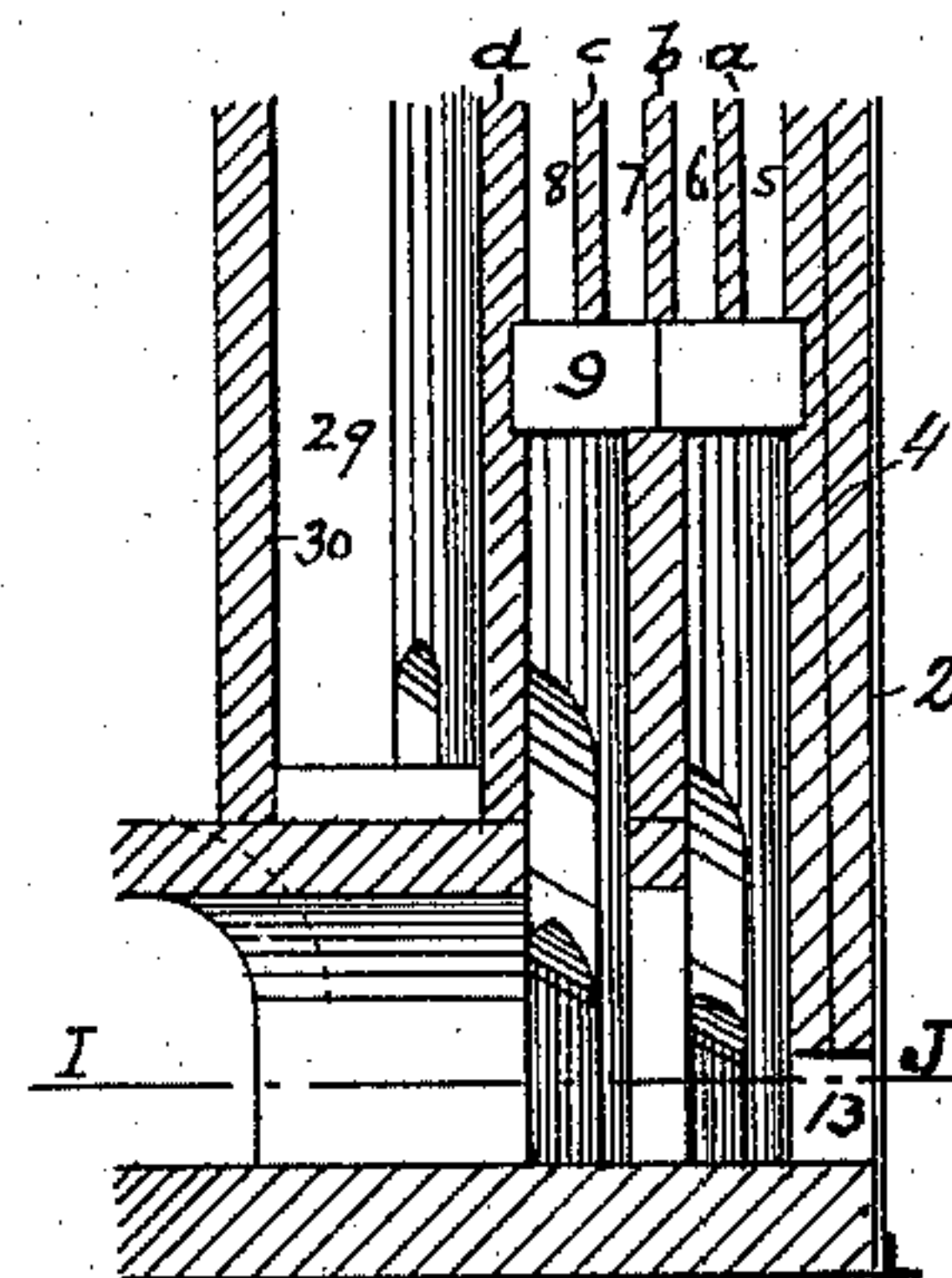
No. 573,900.

Patented Dec. 29, 1896.



Section K-II

Fig. 2



Section K-III

Fig. 3

Witnesses  
M. H. Carkey.  
H. W. Middlemist.

Fig. 1

Section I-I

Inventor  
George W. McClure,  
by Wm. L. Pierce,  
his attorney



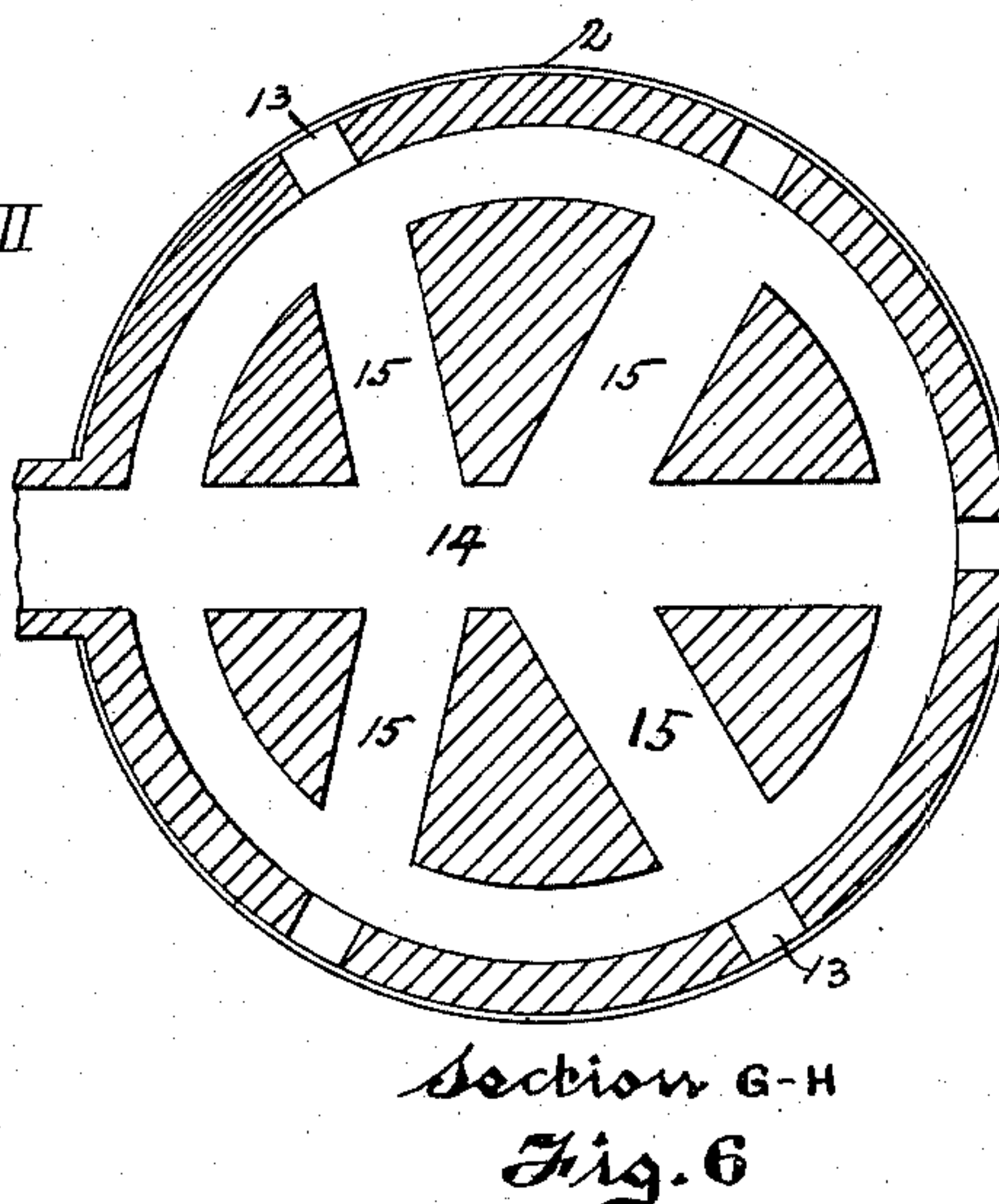
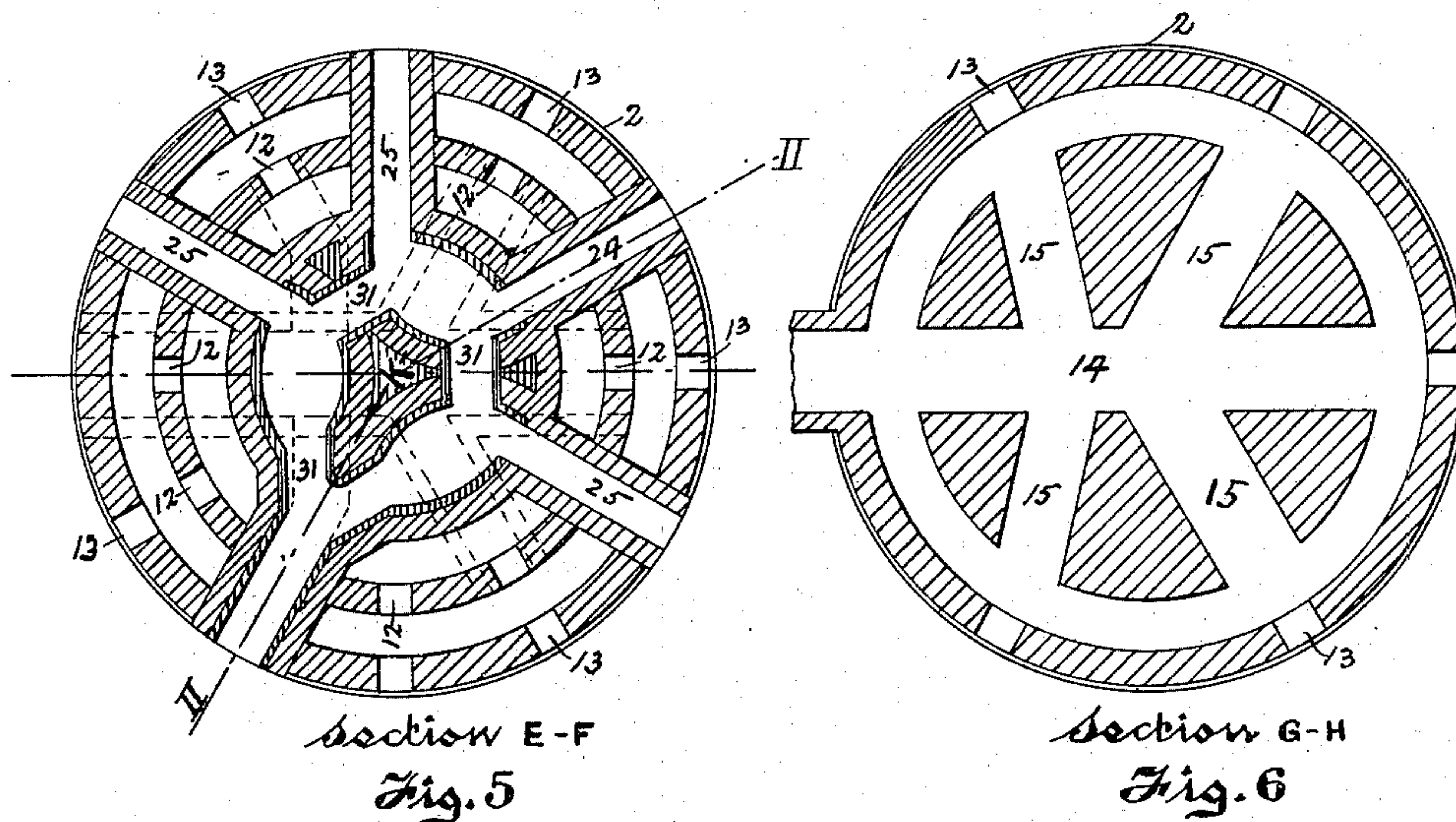
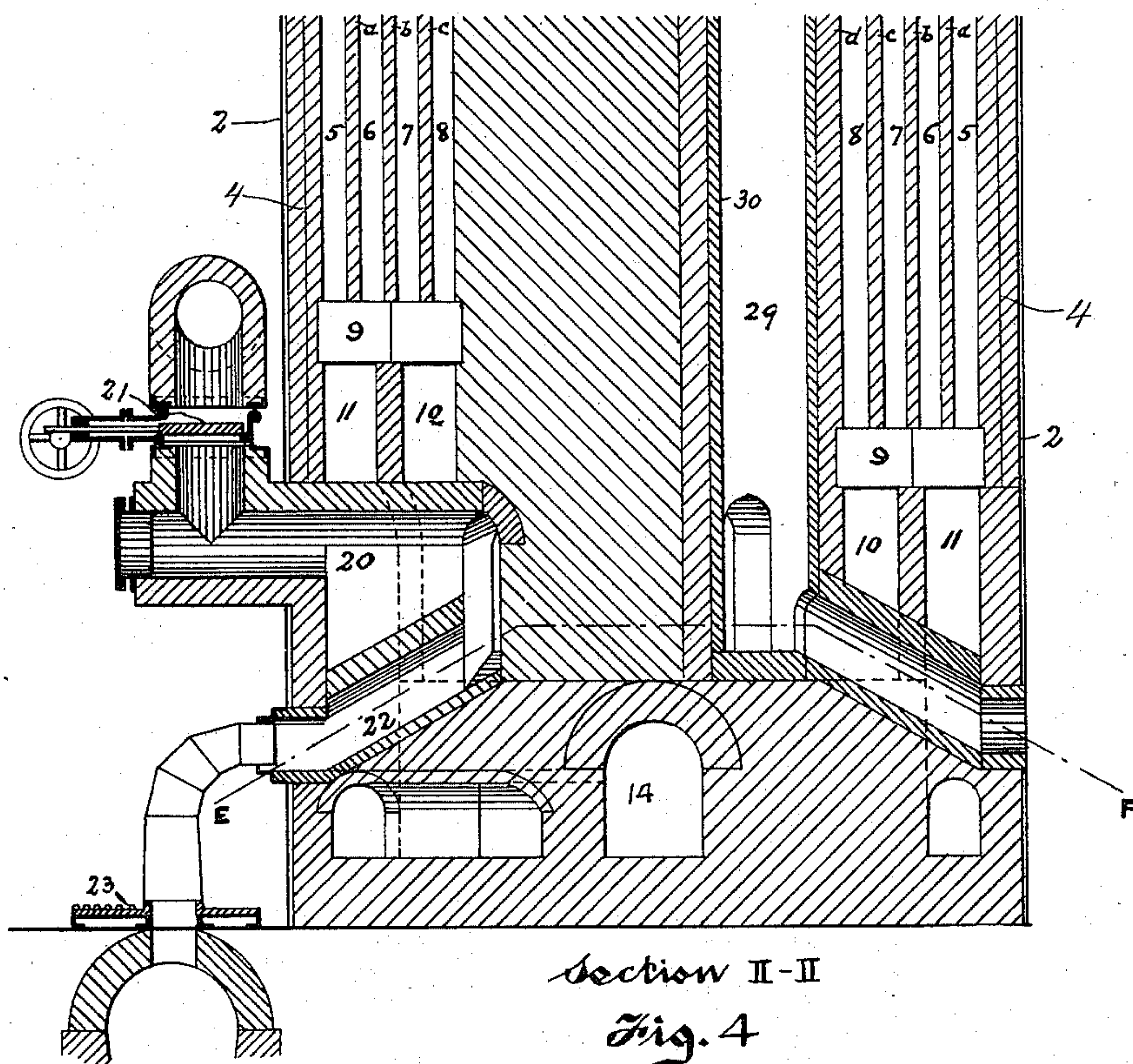
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3 Sheets—Sheet 2.

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HOT BLAST STOVE.

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Witnesses  
M. T. Caskey  
H. W. Middlemist

In witness  
George W. McHolme,  
by Wm L. Pierce,  
his attorney



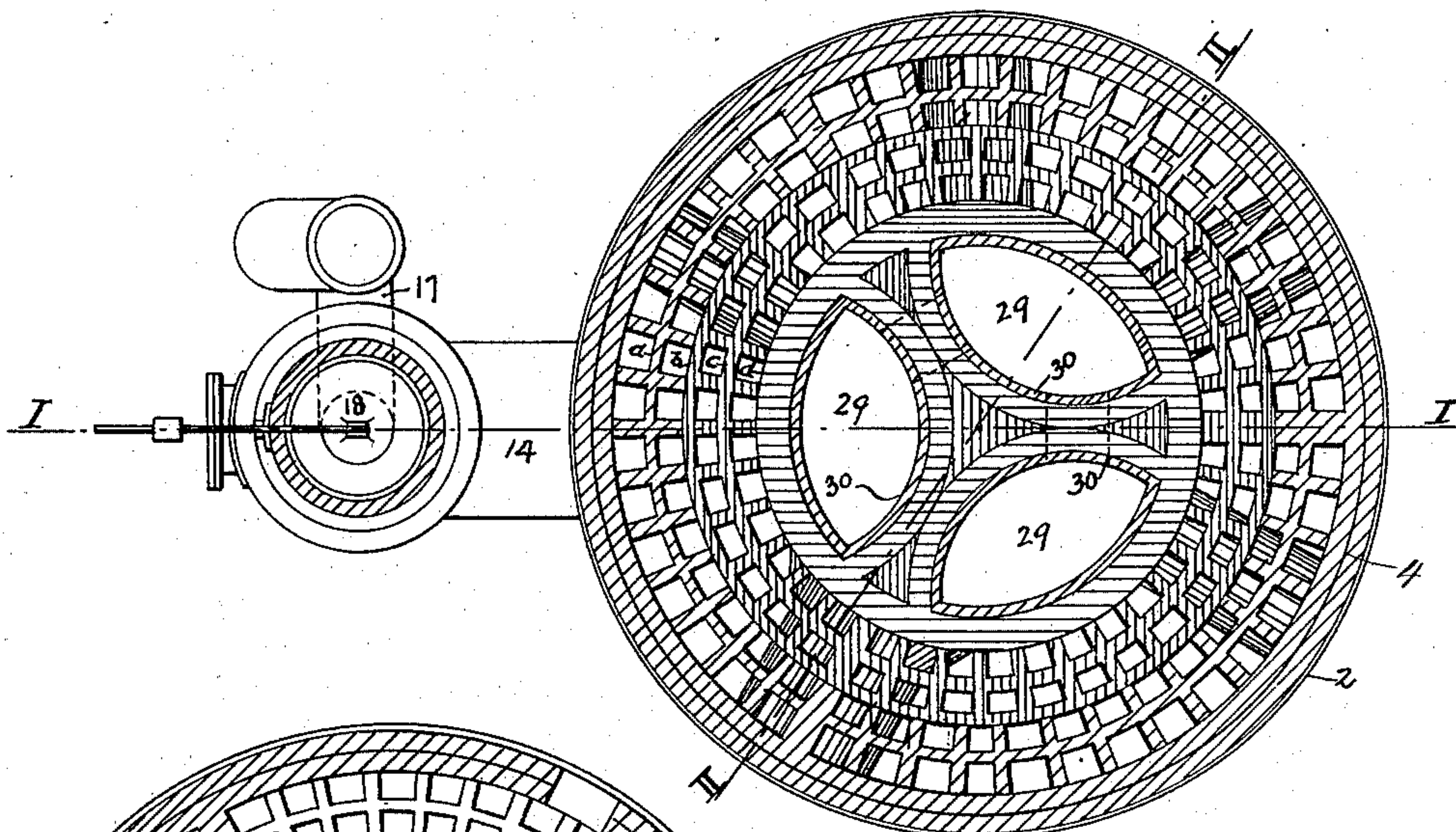
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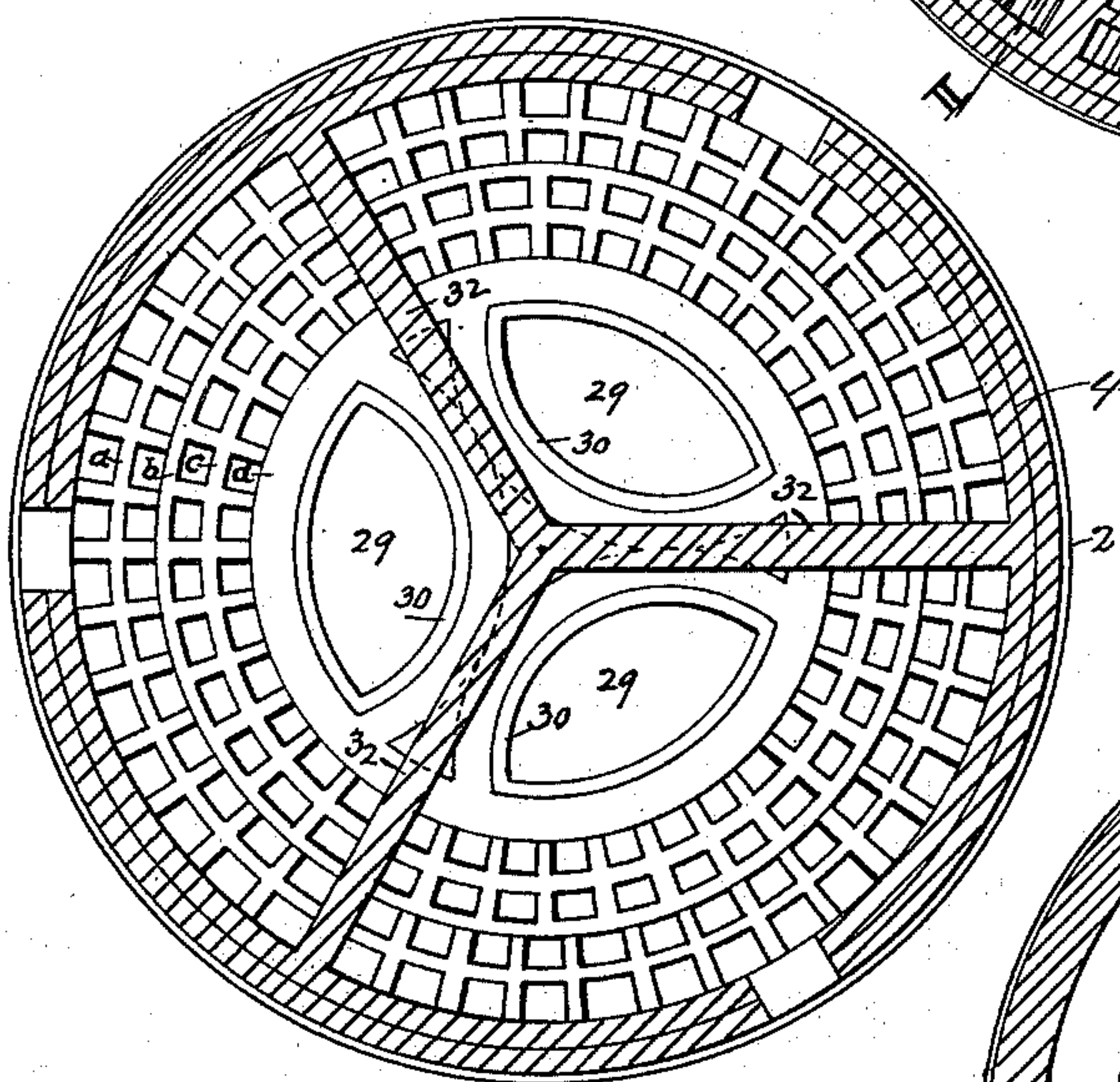
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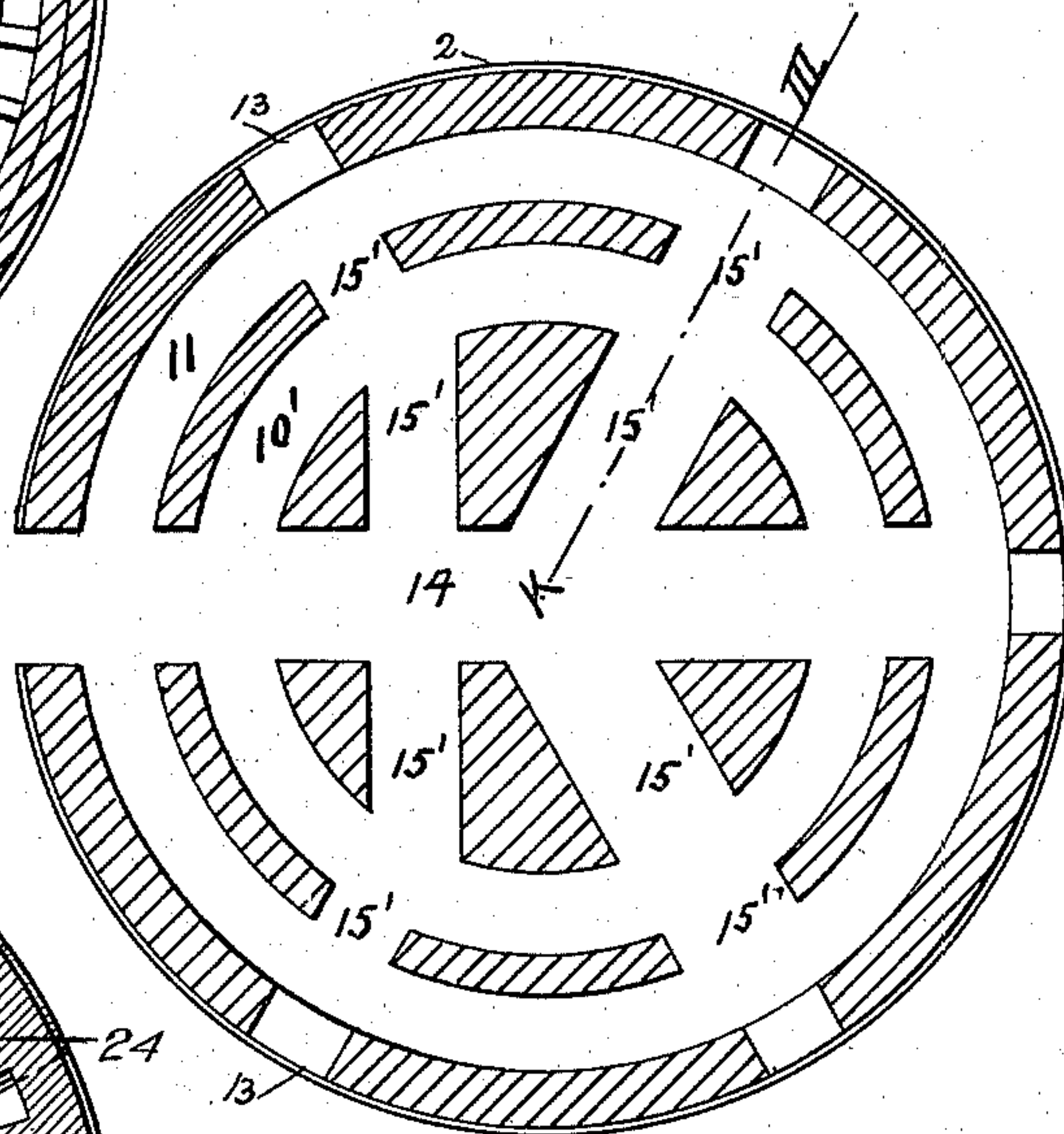
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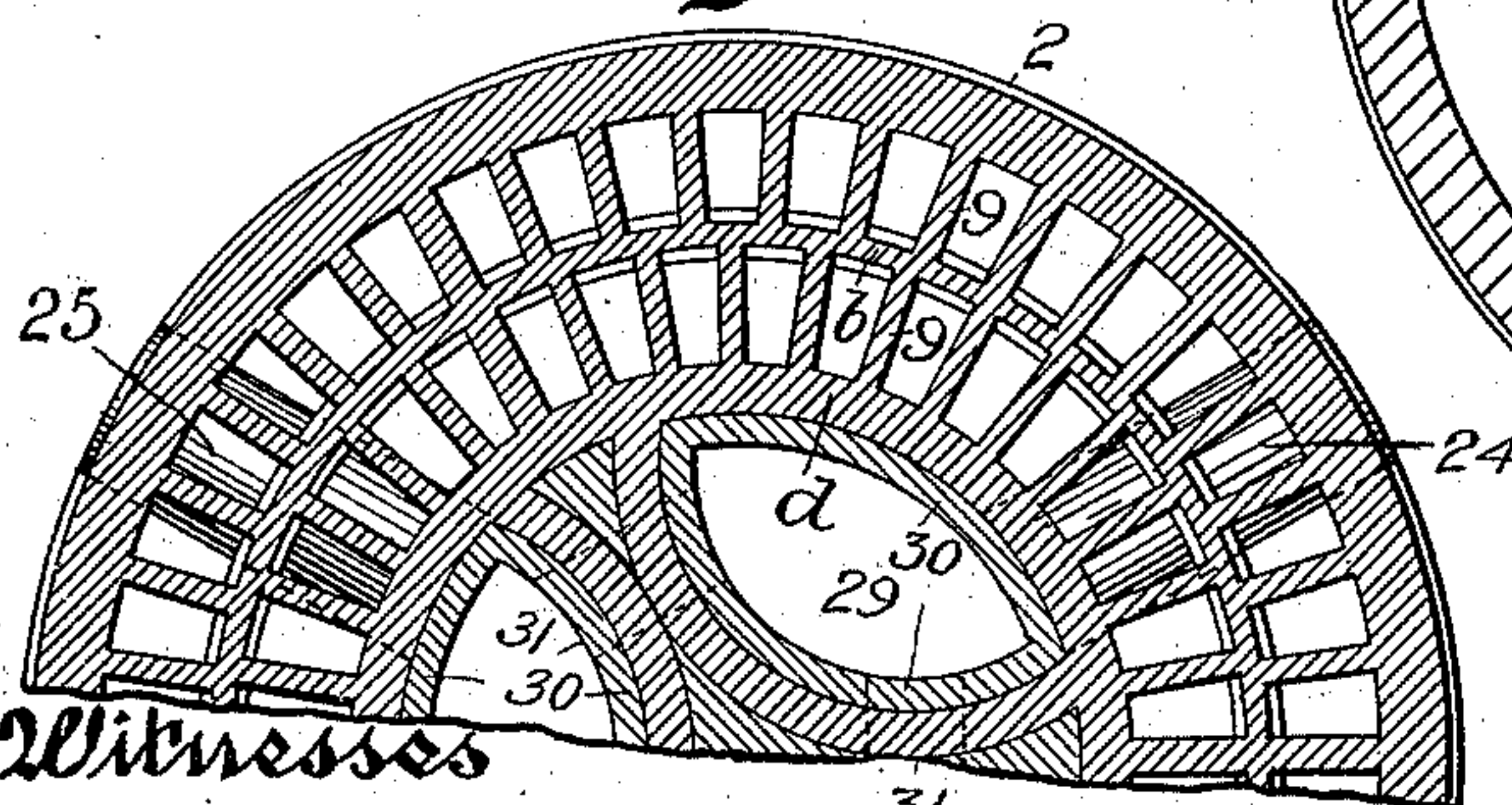
Section C-D  
Fig. 7



Section A-B  
Fig. 8



Section I-J  
Fig. 9  
Inventor  
George W. McClure  
by Wm. L. Pierce  
his Attorney



Witnesses  
M. W. Caskey,  
H. W. Middlemist  
Fig. 10.



# UNITED STATES PATENT OFFICE.

GEORGE W. MCCLURE, OF PITTSBURG, PENNSYLVANIA.

## HOT-BLAST STOVE.

SPECIFICATION forming part of Letters Patent No. 573,900, dated December 29, 1896.

Application filed November 29, 1895. Serial No. 570,409. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. 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 section on line I I of Fig. 7. Fig. 2 is a section on line K II of Fig. 5. Fig. 3 is a modification showing both annular flues extending to the base of the stove and is a section on line K III of Fig. 9. Fig. 4 is a section on line II II of Fig. 7. Fig. 5 is a section on line E F of Fig. 4. Fig. 6 is a section on line G H of Fig. 1. Fig. 7 is a section on line C D of Fig. 1. Fig. 8 is a section on line *a b* of Fig. 1. Fig. 9 is a section of the modification seen in Fig. 3 and on line I J of that figure, and Fig. 10 is a horizontal section through flue 9 of Fig. 4.

The purpose of my invention, generally stated, is to devise a two-pass fire-brick hot-blast stove with three center combustion-chambers.

I do not claim in this application the feature of the inner dome, nor its independency of the shell of the stove, nor the automatic valve which controls the entrance of air into the space between the roof and the inner dome, nor the feature of building the combustion-chambers, linings, and flues independent of each other, nor the extension of both annular flues to the base of the stove, as these constitute, *inter alia*, the matter of a separate application filed by me October 17, 1895, Serial No. 565,933.

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

*a*, *b*, *c*, and *d* are concentric annular walls inclosing between themselves and the lining 4 four annular flues 5 6 7 8. The walls *a*, *b*, and *c* run from a point just below the base of the inner dome to a point somewhat above the level of the chimney-flue, where they are supported on girders set on edge and themselves set into the lining 4 and wall *d*. These girders encircle the stove and constitute a horizontal annular flue 9, into which the vertical flues 5 6 7 8 lead. This horizontal flue

changes its level in passing above the hot-blast-inlet flue, as seen clearly in Fig. 4. Below flue 9 are the two vertical concentric annular flues 10 11. The flue 11 extends to the base of the stove, while the flue 10 extends to the level of the top of the stack-flue. Outlet from flue 10 to flue 11 is afforded by cross-flues 12 12.

13 13 are the usual cleaning-openings at different levels.

14 is the stack-flue, connected with flue 11 by suitable cross-flues 15 15. In the modification shown in Figs. 3 and 9 inner flue 10' extends to the base of the stove, while suitable cross-flues 15' 15' connect flues 11 and 10' with stack-flue 14.

16 is the stack having cold-blast inlet 17. The stack is controlled by valve 18, access to which is gained by door 19.

20 is the hot-blast outlet controlled by valve 21.

22 is one of the two gas-inlets governed by valve 23, and 24 the second gas-inlet.

25 25 25 are the three air-inlets.

26 is the roof of the furnace, and 27 the valve for admitting cold air into the space between the roof and the false roof or dome 28, which valve seats itself when the pressure within said space, communicated from the interior of the stove, reaches a predetermined height.

The combustion-chambers 29 29 29 are three in number and are central, being all included within the inner annular wall *d*. They are all provided with suitable linings 30 30 for a portion of their height. They start immediately above the level of the chimney-flue and at their base they communicate with each other through short combustion-flues 31 31. (Seen clearly in Fig. 5.) Gas and air are supplied to them through the three air-inlets 25 25 25 and the gas-inlets 22 and 24. Immediately above the communicating cross-flues 31 31 the combustion-chambers become independent of each other and assume, preferably, the oval shape seen in Fig. 8. In this form they are carried up to substantially the top level of the annular flues 5 6 7 8. From the top level of said flues 5 8 spring three walls 32 32 32, (seen in Figs. 8 and 1,) extending to the roof, which divide the conical dome-space of the stove into three substantially equal



parts, each of which is in communication with one combustion-chamber and with about a third of the annular flue-space.

In operation, when the stove is on gas, the hot-blast and cold-blast valves are closed and the gas and air valves opened. As the combustion-chambers communicate at their base, the gas and air are uniformly distributed and burn in the three chambers, ascending to the top of the combustion-chambers. Thence each chamber contributes its quota to its respective third part of the annular flues and the products of combustion descend said flues, passing down to annular flue 9, which distributes to flues 10 and 11. In the first style of construction flue 10 connects by cross-flues 12 12 with flue 11, which leads to stack-flue 14 and thence to stack.

In the modification of Figs. 3 and 9 flue 10' reaches the base of the stove and communicates both by cross-flues and directly with the stack-flue. By this construction three independent stoves are secured and irregularity of draft avoided, the distribution being practically perfect.

When the stove is sufficiently heated, the stack-outlet, gas and air inlets are cut off and the cold blast turned on and the hot-blast valve open, the cold blast making a re-traverse of the annular flues and combustion-chambers to the hot-blast outlet. Meantime valve 27 has been dropped, permitting cool air to enter and circulate beneath the roof 26, thus avoiding overheating thereof. Should the blast-pressure force air through dome 28 to any great extent, the pressure will seat valve 27 and prevent loss of heat.

Obviously walls 32 32 may be omitted, but the uniformity of distribution will be impaired.

Having described my invention, I claim—

1. In two-pass hot-blast stoves, the combination of an exterior cylindrical shell; a dome; a smaller, interior concentric, cylindrical shell extending substantially from the level of the stack-flue to the lower edge of the dome a stack-flue in the base of the stove; three combustion-chambers arranged within said interior cylinder, said chambers communicating with each other at the base but independent from thence upward an independent air-inlet for each combustion-chamber and a series of concentric, annular, vertical, flues extending around the stove between the inner and outer cylinders.

2. In two-pass hot-blast stoves, the combination of an exterior cylindrical shell; a dome; a smaller, interior concentric, cylindrical shell extending substantially from the level of the stack-flue to the lower edge of the dome; three combustion-chambers arranged within said interior cylinder, said chambers communicating with each other at the base but independent from thence upward; an independent air-inlet for each combustion-chamber a series of concentric, annular, vertical, flues extending around the stove between the inner and outer cylinders, and walls dividing the dome of the stove into substantially three equal portions, each portion communicating with one combustion-chamber and with substantially one-third of the vertical flues.

3. In two-pass hot-blast stoves, the combination of an exterior cylindrical shell; a dome; a smaller, interior, concentric, cylindrical shell extending substantially from the level of the stack-flue to the lower edge of the dome; three combustion-chambers arranged within said interior cylinder, said chambers communicating with each other at the base but independent from thence upward; an independent air-inlet for each combustion-chamber a series of concentric, annular, vertical, flues extending around the stove between the inner and outer cylinders, and a common outlet from the base of said combustion-chambers to the hot-blast main.

4. In two-pass hot-blast stoves, the combination of an exterior cylindrical shell; a dome; a smaller, interior concentric, cylindrical shell extending substantially from the level of the stack-flue to the lower edge of the dome; three combustion-chambers arranged within said interior cylinder, said chambers communicating with each other at the base but independent from thence upward; an independent air-inlet for each combustion-chamber a series of concentric, annular, vertical, flues, extending around the stove between the inner and outer cylinders; an extension of the vertical flues to the base of the stove; a stack-flue and cross-flues connecting said extension to the stack-flue.

In testimony whereof I have hereunto set my hand this 23d day of November, A. D. 1895.

GEORGE W. MCCLURE.

Witnesses:

WM. L. PIERCE,  
L. D. IAMS.