

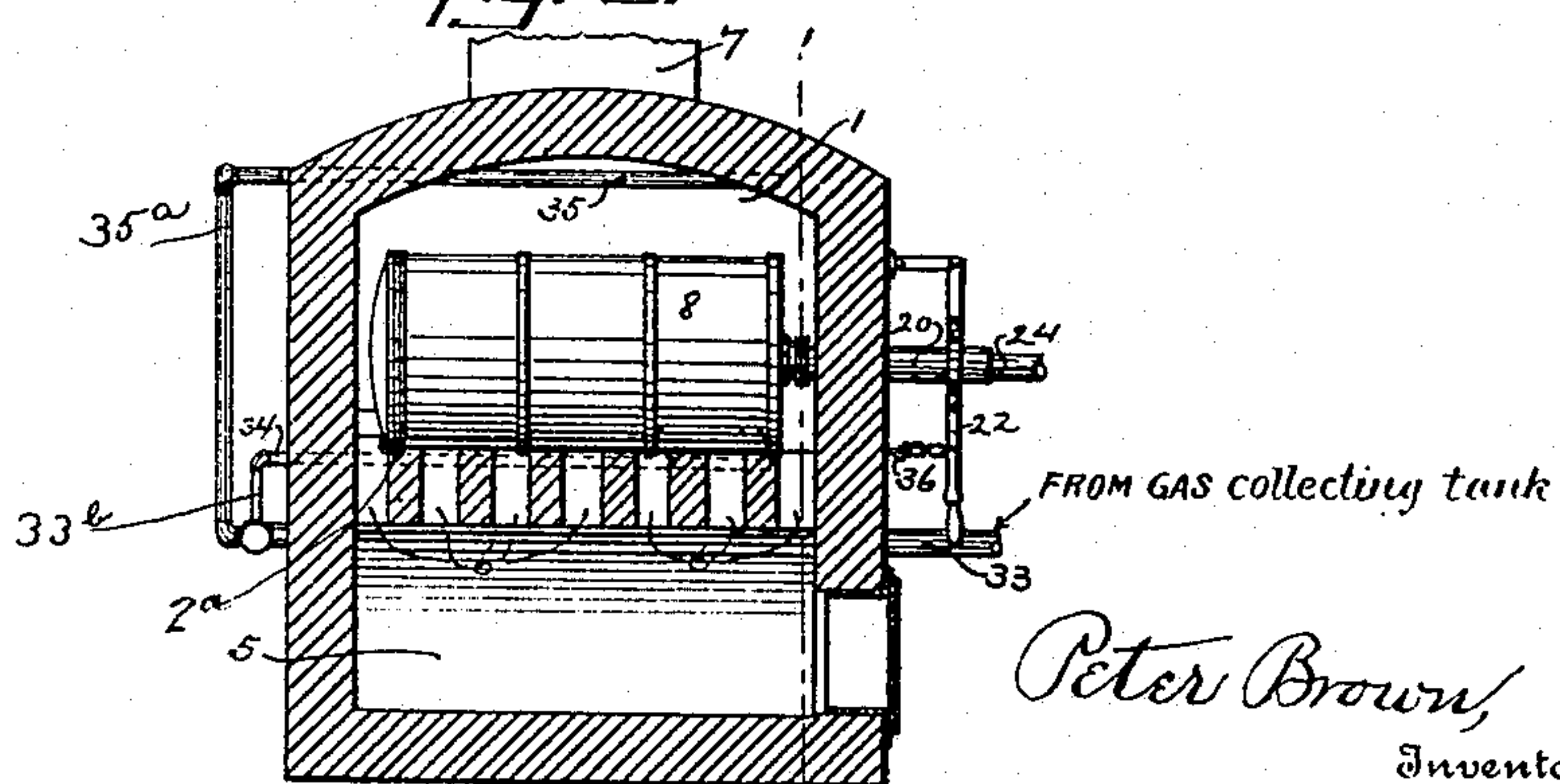
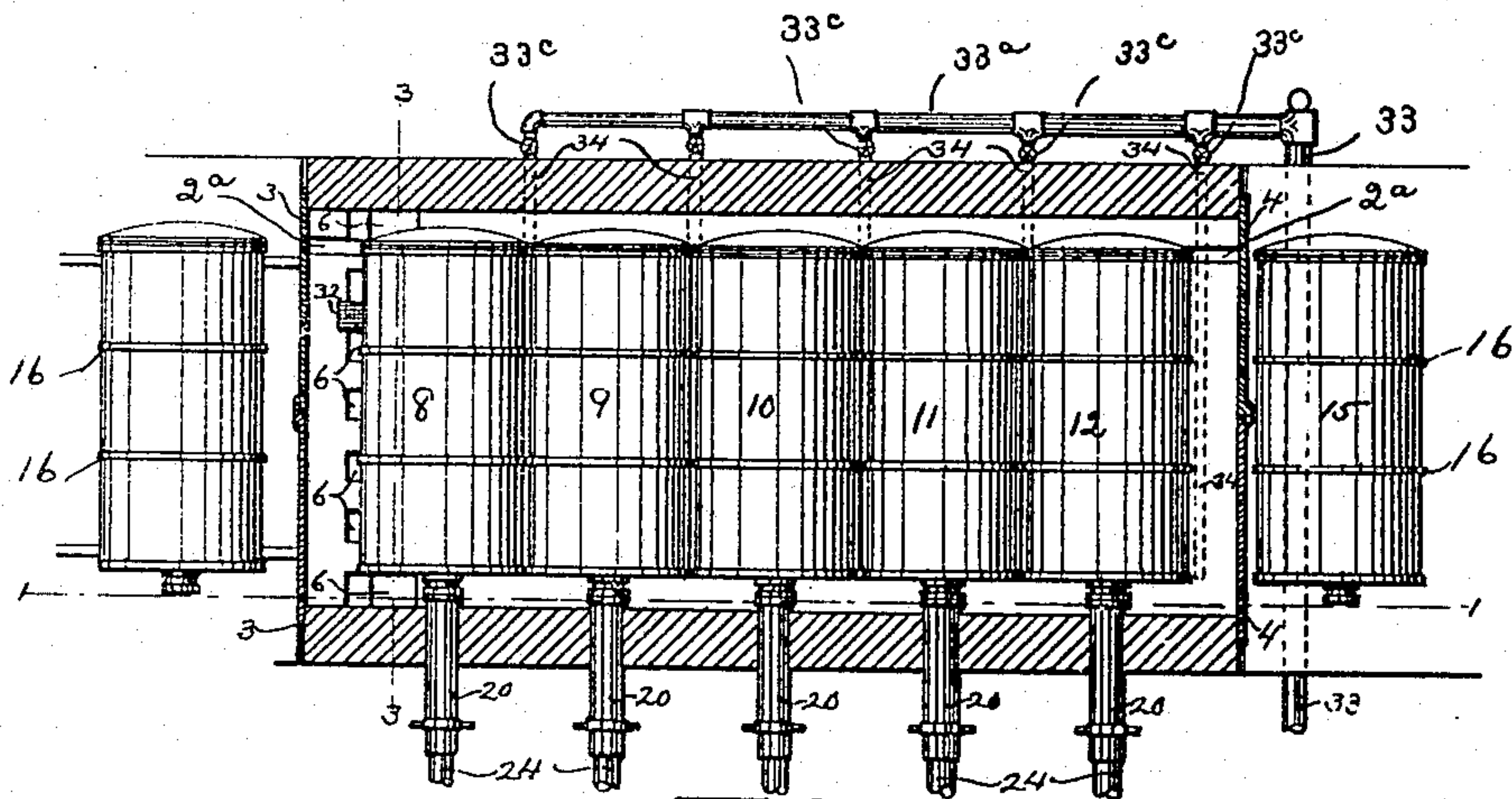
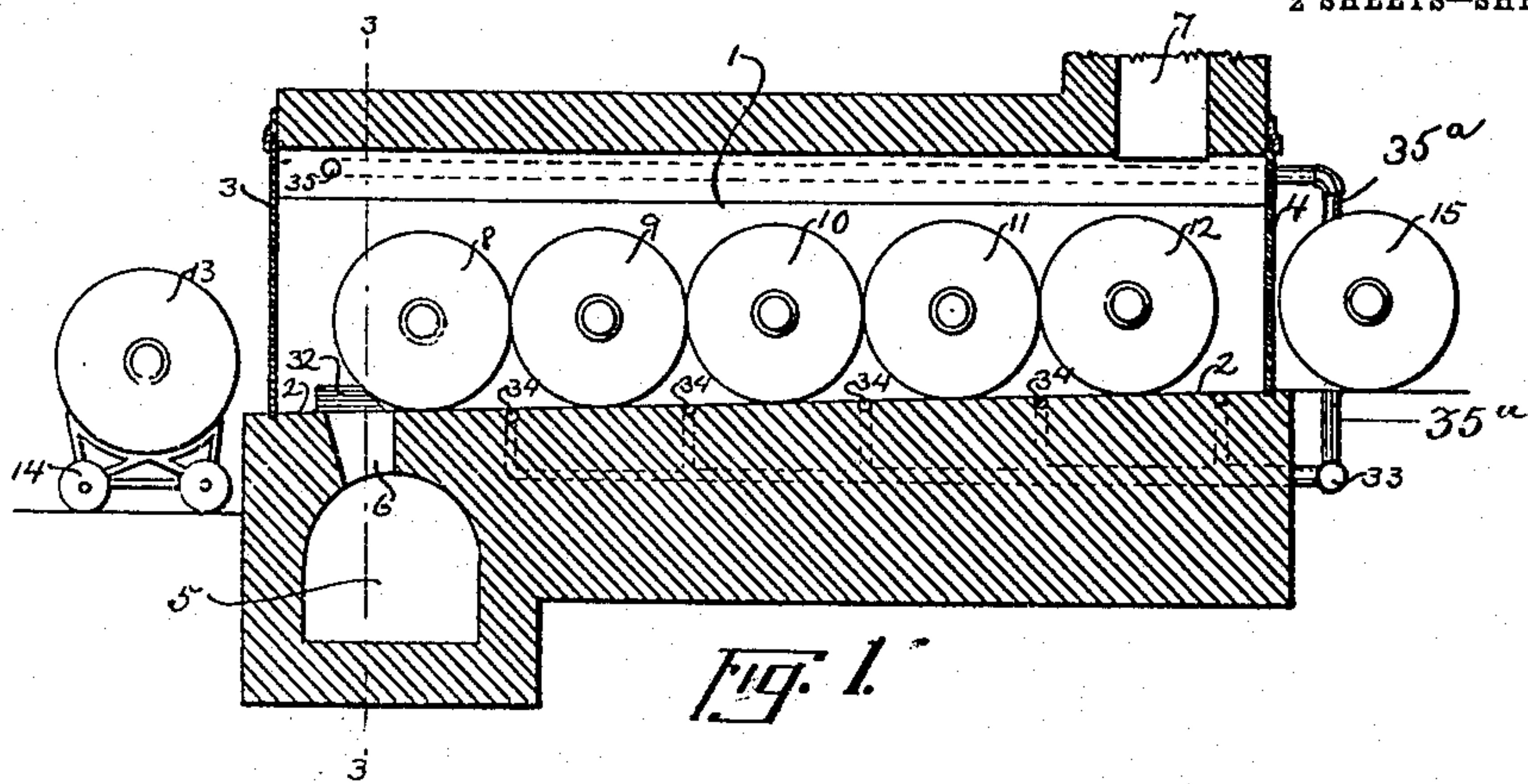
No. 835,237.

PATENTED NOV. 6, 1906.

P. BROWN.
RETORT FURNACE.

APPLICATION FILED OCT. 24, 1904.

2 SHEETS—SHEET 1.



Witnesses

Ernest Mock.

W. Countryman

By

G. W. Bullard.

Attorney



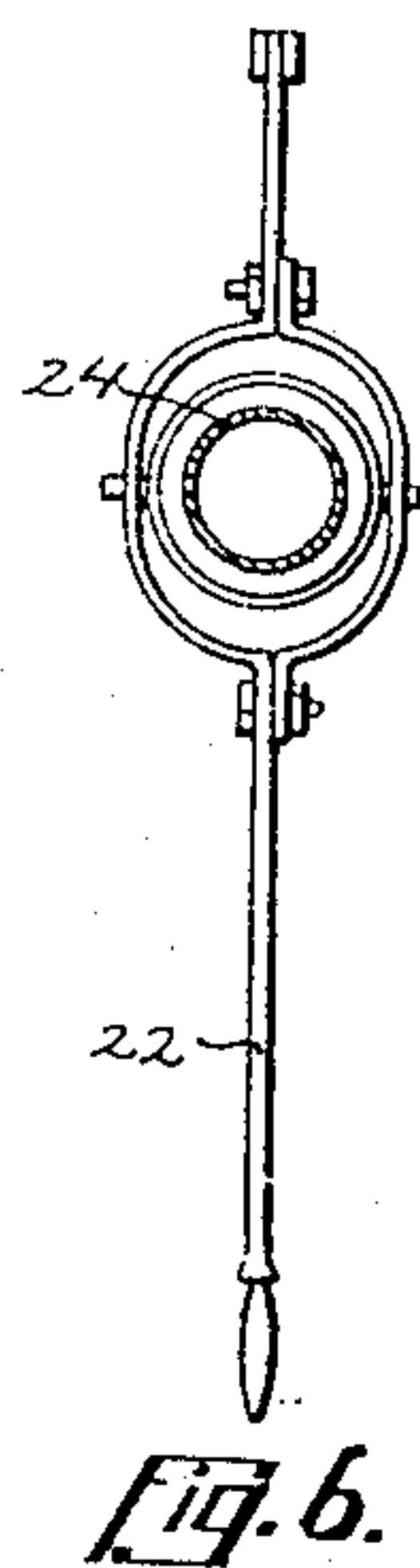
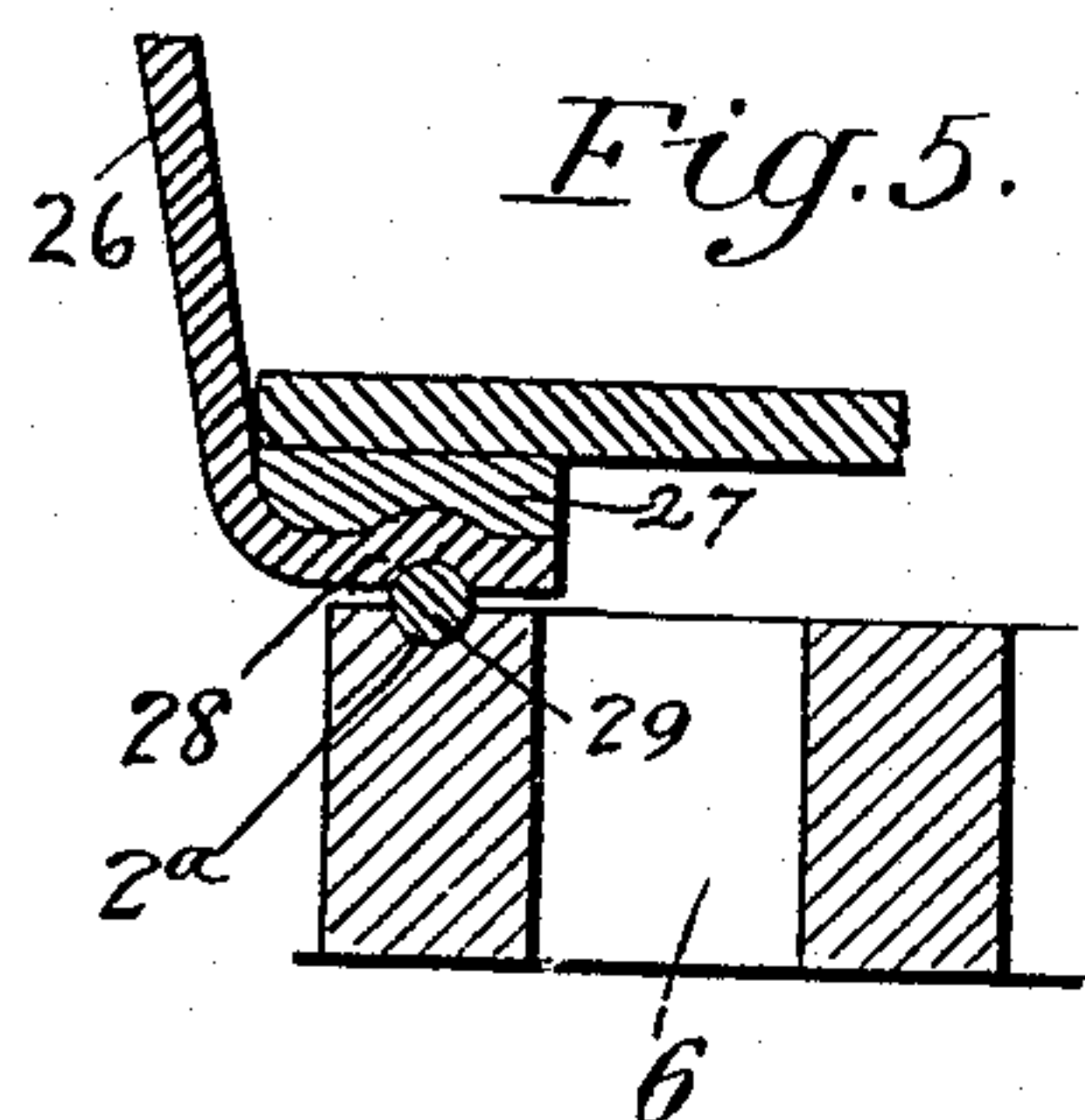
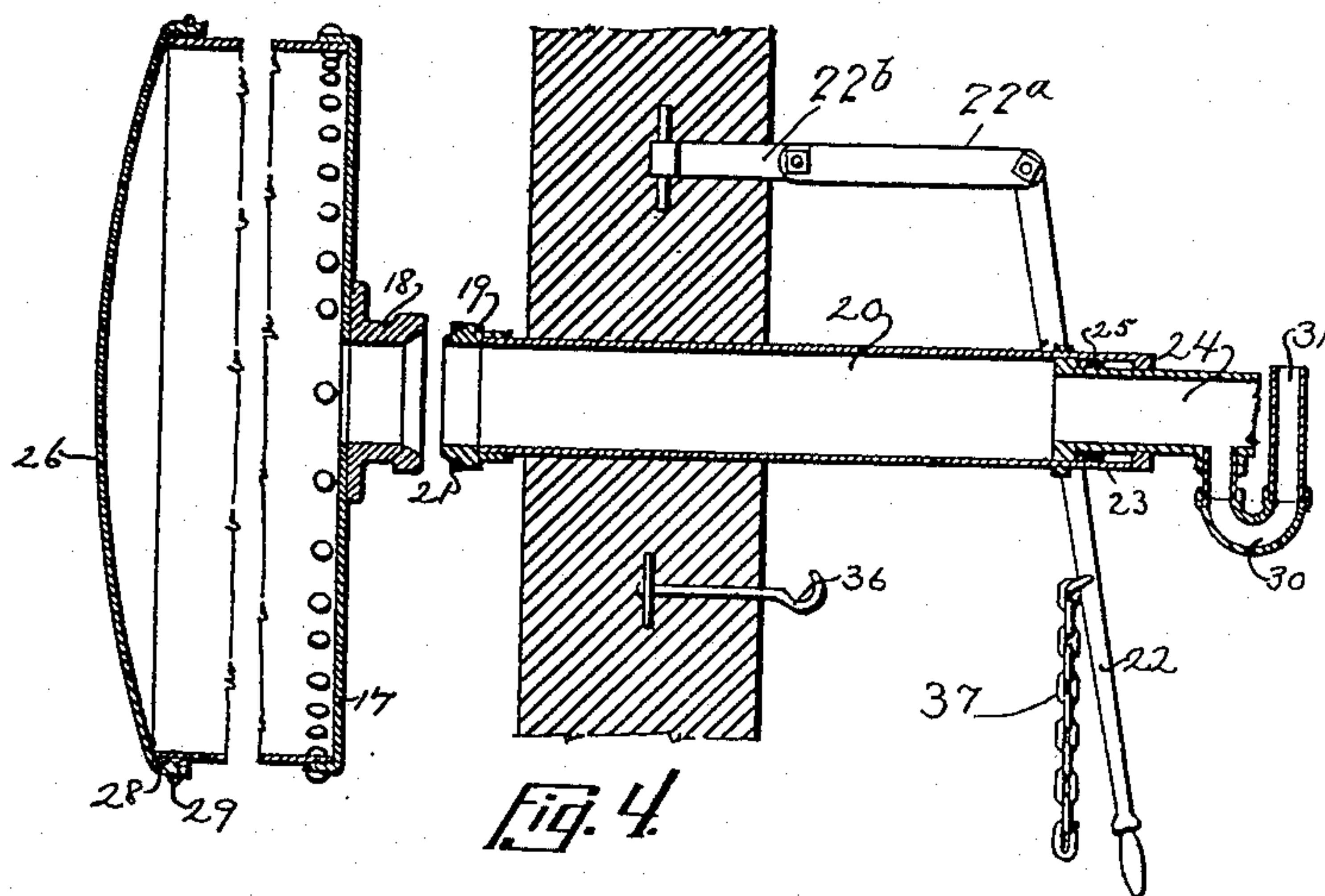
PETERSON'S PATENT CO., WASHINGTON, D. C.

No. 835,237.

PATENTED NOV. 6, 1906.

P. BROWN.
RETORT FURNACE.
APPLICATION FILED OCT. 24, 1904.

2 SHEETS—SHEET 2.



Peter Brown.

Inventor

Witnesses

Ernest Mock.

W. Courtney Baser.

By

G. W. Bullard.

Attorney

UNITED STATES PATENT OFFICE.

PETER BROWN, OF BELLINGHAM, WASHINGTON, ASSIGNOR TO TROY
CHEMICAL MANUFACTURING COMPANY (LIMITED), OF TROY,
IDAHO.

RETORT-FURNACE.

No. 835,237.

Specification of Letters Patent.

Patented Nov. 6, 1906.

Application filed October 24, 1904. Serial No. 229,855.

To all whom it may concern:

Be it known that I, PETER BROWN, a citizen of the United States, residing at 119 Unity street, in the city of Bellingham, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Retort-Furnaces, of which the following is a specification.

My invention pertains to furnaces and retorts for the production of charcoal and the distillation of woods.

The objects of the invention are to produce improved features of construction and arrangement of parts to effect the results hereinafter specified; and the invention consists in the features which will be hereinafter described and then sought to be clearly defined by the claims.

In the drawings, Figure 1 is a vertical section lengthwise of the furnace on the line 1 1 of Fig. 3. Fig. 2 is a plan or horizontal section of the furnace, showing the location of the several retorts used in the same. Fig. 3 is a vertical cross-section of the furnace on the line 3 3 of Fig. 2. Fig. 4 is an enlarged section of the retort, with a portion broken away, and of the connecting and discharging pipe. Fig. 5 is an enlarged detail, with the parts magnified, showing the manner of closing the end of the retort and also showing a section of the furnace-chamber hearth. Fig. 6 is an end view showing the hand-lever for operating the attaching and detaching pipe within the retort.

Similar characters refer to similar parts in the several views.

My invention comprises a furnace-chamber 1, having an inclined hearth 2, said furnace being suitably constructed with materials commonly used in furnace masonry. The ends of the furnace are provided with the close-fitting sliding doors 3 and 4. The furnace is heated from the combustion-chamber 5, having flue-opening 6 into the furnace-chamber 1 at the lower end of the hearth, as seen in Figs. 1 and 3. A flue 7 at the opposite end of the furnace carries off the waste products of combustion.

My furnace is designed to contain a number of air-tight retorts, as shown at 8, 9, 10, 11, and 12. These retorts are constructed of sheet metal of suitable thickness and strength and are reinforced with stays or hoops 16. One end of each retort is closed with a sheet-

metal cap securely riveted thereto, as shown in Fig. 4 at 17. In the center of this end is provided an opening 18, so made as to receive a cone-shaped fitting 19 on the end of the attachable and detachable pipe 20. This cone-shaped fitting is provided with an asbestos collar or gasket 21, which provides an air-tight connection when pressed into the necked opening 18. The attachable and detachable pipe 20 is moved back and forth by means of the hand-lever 22, pivotally connected with the pipe and jointed to the link 22^a, pivotally connected to the ear 22^b. It will be observed that the attachable and detachable pipe 20 has a telescopic expansion-joint 23 with the fixed pipe 24. This conducts the gaseous by-products to the condensing-coils and collection-tanks. (Not shown.) This telescopic expansion-joint is also provided with an asbestos gasket 25, whereby the joint is made tight. The opposite end of each retort is closed with a sheet-metal cover 26. This cover is preferably made of copper or other suitable material and so that the same may be slipped onto the end of the retort with ease. The wall of the retort at its end is provided with a grooved ring or block 27, brazed or riveted thereto, and the flange 28 of the sheet-metal cover is slipped over 27 and sprung, so as to conform to the groove in 27. A stout wire 29 is then coiled about the flange 28, pressing same down into groove 27. The wire is then anchored in place by twisting its ends together, thus forming an air-tight cover to the end of the retort.

The gaseous by-products from the retorts are condensed and collected in a manner common to such operations and comprise no novelty in connection with my invention.

Near the telescopic expansion-joint 23 I attach a blow-off trap 30. This trap forms a seal that prevents the liquid by-products from escaping from the pipe and at the same time will indicate when the pipes between the telescopic joint and condensing-tank is stopped up, and the same will blow off through opening 31, and the operator will know that the pipes require cleaning out.

To operate my invention, first heat the furnace-chamber 1 by building a fire in the combustion-chamber 5 and heat the furnace to the desired temperature. Then fill the retort with wood and seal the end 26, as pre-

viously described, and allow it to roll into the furnace to the position shown by retort 12, the retort being held in that position by empty retorts in advance of it or otherwise, and attach the pipe 20 thereto, said pipe passing through the wall of the furnace by means of the sealing-joint 19. I allow this retort to stay in this position until the lighter by-products are drawn off the wood, when it is disconnected and allowed to roll down the inclined hearth 2 to the position shown by retort numbered 11. A freshly-filled retort is then rolled in to take its place and both retorts coupled to their respective pipes 20. After these have remained in this position for a suitable time the retort in the position of retort 11 is detached from its pipe and allowed to roll to the position indicated by retort 10. The retort in the position of retort 12 is similarly detached from its pipe and moved to position shown by retort numbered 11, and a freshly-filled retort is rolled in to take its place and coupled to its pipe 20. This operation is continued until the furnace is filled with retorts, as shown in Figs. 1 and 2. When the wood is thoroughly charred in the lowest retort, (shown in position of retort 8,) the door 3 is opened and retort 8 is allowed to roll out onto the truck 14, as shown by retort 13. A small movable block 32 is set upon the hearth to stop the retort at the proper place at the lower end of the hearth. The door 3 is then closed, and each retort in turn is allowed to move down one space, and a freshly-filled retort again inserted through the sliding door 4 at the upper end of the hearth. This operation is continued indefinitely at the will of the operator.

It is to be observed that after the retorts are sufficiently heated to produce a quantity of gas within the collecting-tanks (not shown) the gas thus produced may be used as fuel for heating the furnace in producing charcoal and by-products from wood. This is done by means of the gas-pipe 33, designed to be connected with the gas-collecting tank. This main pipe is connected with a lateral pipe 33^a, from which lead branch pipes 33^b, set below the surface of the hearth of the furnace, with inlets between each pair of retorts, as shown at 34. These several pipes having inlets in the hearth of the furnace each has a valve 33^c of any approved pattern for regulating the flow of gas thereto, and gas may be supplied thereby to each gas-inlet in a manner to secure any degree of heat desired. In addition to these gas-inlets an inlet is provided in the upper part of the furnace, as shown at 35, near gate 3, to which gas is conducted through pipe 35^a, leading from pipe 33. The gas from this inlet will heat the upper part of the furnace, the products of combustion passing along the furnace-top to the waste-flue 7. The furnace now being heated by the gase-

ous products therein, as described, the fire in the combustion-chamber 5 may be dispensed with and the furnace operated entirely with the gaseous fuel produced from the wood under distillation.

It is to be observed that the several retorts within the furnace being connected with the pipe through which the various kinds of by-products are collected at the proper stage of condensation, the different by-products may be collected in the most satisfactory manner, the lighter by-products being collected from the retort at the upper end of the hearth and the heavier by-products, such as creosote and tar, being collected from the retort at the lower end of the hearth just before the wood is reduced to charcoal.

After the retort is allowed to roll outside of the furnace the opening 18 will be closed with a stopper-shaped plug and made airtight. The retort is then allowed to stand in the open air until the charcoal is thoroughly cooled. The end cover 26 is then removed by cutting the wire 29 and the charcoal removed from the retort, when the same can be refilled and placed at the upper end of the furnace to be used again. The charcoal is sacked and prepared for market in the usual manner, and the by-products, as previously stated, are condensed during the operation of the furnace in a manner common to such operations, the process having no special novelty in connection with my invention.

It is to be observed that the furnace is constructed with a groove 2^a, extending lengthwise of the hearth to receive a part of the retort—say the stout binding-wire 29, which forms a projection at that end of the retort—so that when the adjustable connection 19 is pushed into the opening 18 the groove in connection with the projecting portion of the retort 28 fitting therein prevents the retort being pushed back against the wall of the furnace, and the pressure of joint 19 against 18 holds the retort in place. The lever-arm 22 may be held in place after the joint 19 is made tight against 18 by means of a hook 36 and chain 37 or otherwise.

To prevent the asbestos collar 21 from sticking to opening 18 of retort, I cover the said opening with graphite before the retort is rolled into the furnace, thus preventing the asbestos collar 21 from sticking to said opening 18, and the collar frees itself from 18 when the pipe 20 is pulled back from 18.

Having described my invention and set forth its merits, what I claim is—

1. In a furnace for distillation of wood and making charcoal formed with a retort-receiving chamber, of a series of replaceable retorts in said chamber, each formed with a centrally-disposed opening in one end to receive a pipe, and a series of pipes passing through the wall of the furnace and in a line-

ment with the centrally-disposed openings in the retorts, said pipes being capable of longitudinal movement to couple them with and uncouple them from the openings in the several retorts, substantially as described.

2. In a furnace for distillation of wood and making charcoal formed with a retort-receiving chamber, of a series of replaceable retorts in said chamber, each formed with an opening in one end to receive a pipe, a series of pipes in alinement with the openings in the retorts, and means located outside of the furnace and connected with said pipes for moving the pipes to couple them with and uncouple them from the openings in the several retorts, substantially as described.

3. In a furnace for distillation of wood and making charcoal formed with a retort-receiving chamber, of a series of replaceable retorts in said chamber, each formed with an opening in one end to receive a pipe, a series of pipes passing through the wall of the furnace and in alinement with the openings in the retorts, and capable of longitudinal movement to couple them with and uncouple them from the openings in the several retorts, means located outside of the furnace for moving said pipes, and a trap and blow-off for each of said pipes, substantially as described.

4. In a furnace for distillation of wood and making charcoal formed with a retort-receiving chamber, of a series of retorts in said chamber, and a series of pipes connecting with said retorts, one for each retort, said pipes being capable of longitudinal movement to adapt them to be coupled to and un-

coupled from said retorts, and each having a separate delivery from the other for the by-products escaping from the retorts so as to maintain the by-products from one retort separate from the by-products of another retort, substantially as described.

5. In a furnace for distillation of wood and making charcoal formed with a retort-receiving chamber having a longitudinally-extending groove in its hearth, of a series of replaceable retorts in said chamber each retort having at one end a part thereof fitting in the groove of the receiving-chamber hearth, a pipe in communication with each retort through its end opposite to the flanged end thereof, said pipe being capable of longitudinal movement to enable it to be coupled to and uncoupled from the retort, and means for moving said pipe and holding it in position, substantially as described.

6. In a furnace for distillation of wood and making charcoal formed with a retort-receiving chamber, of a cylindrical-shaped retort in said chamber, said retort having a removable flanged cover, and means for holding it in place on the retort, said means comprising a grooved ring on the retort, and a wire applied to the flange of the cover opposite to the groove in said ring to press a part of the flange into said groove, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

PETER BROWN.

Witnesses:

ERNEST MOCK,
HOMER W. McFARLANE.