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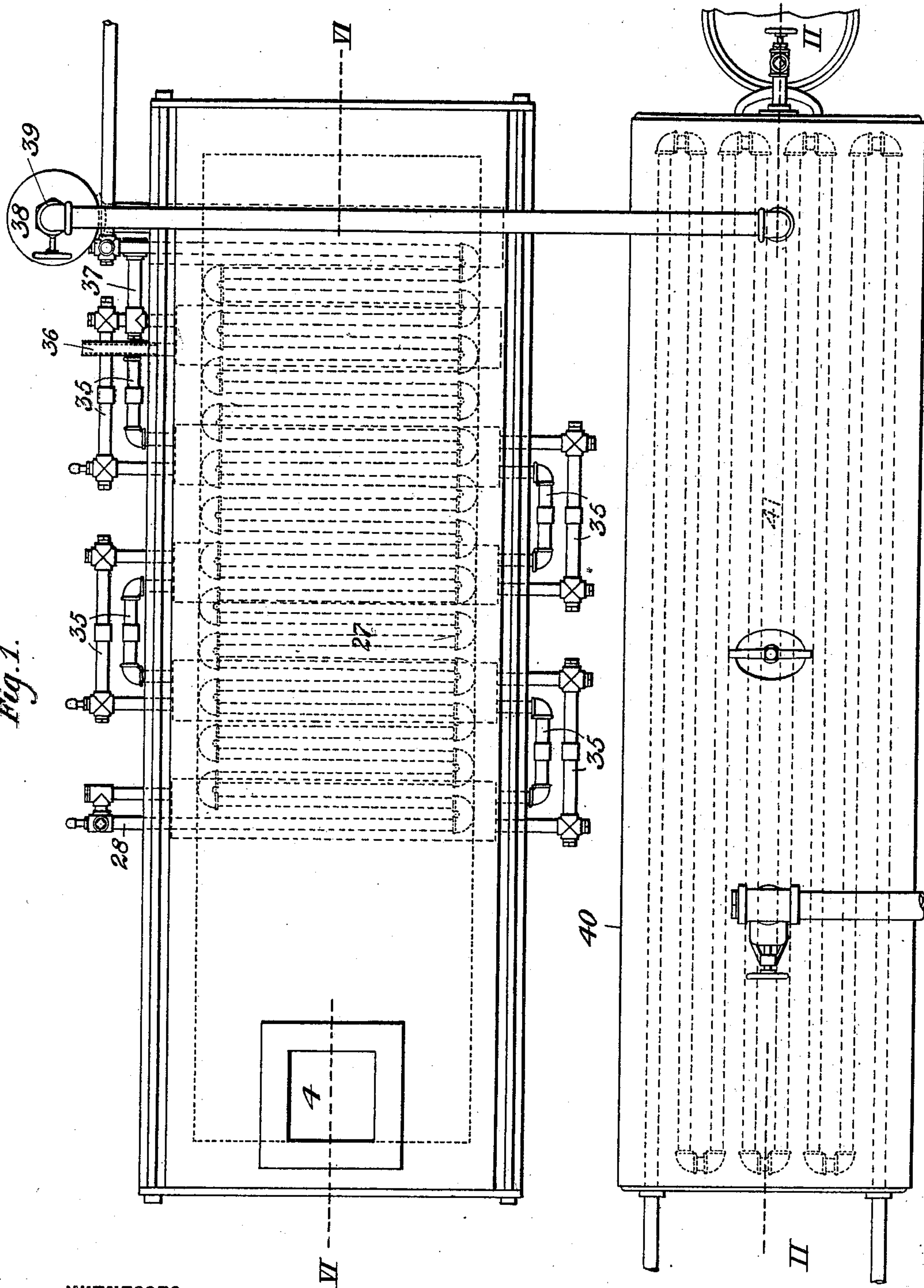
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J. E. WEAVER.
GAS MAKING APPARATUS.

No. 583,697.

Patented June 1, 1897.

Fig. 1.



WITNESSES

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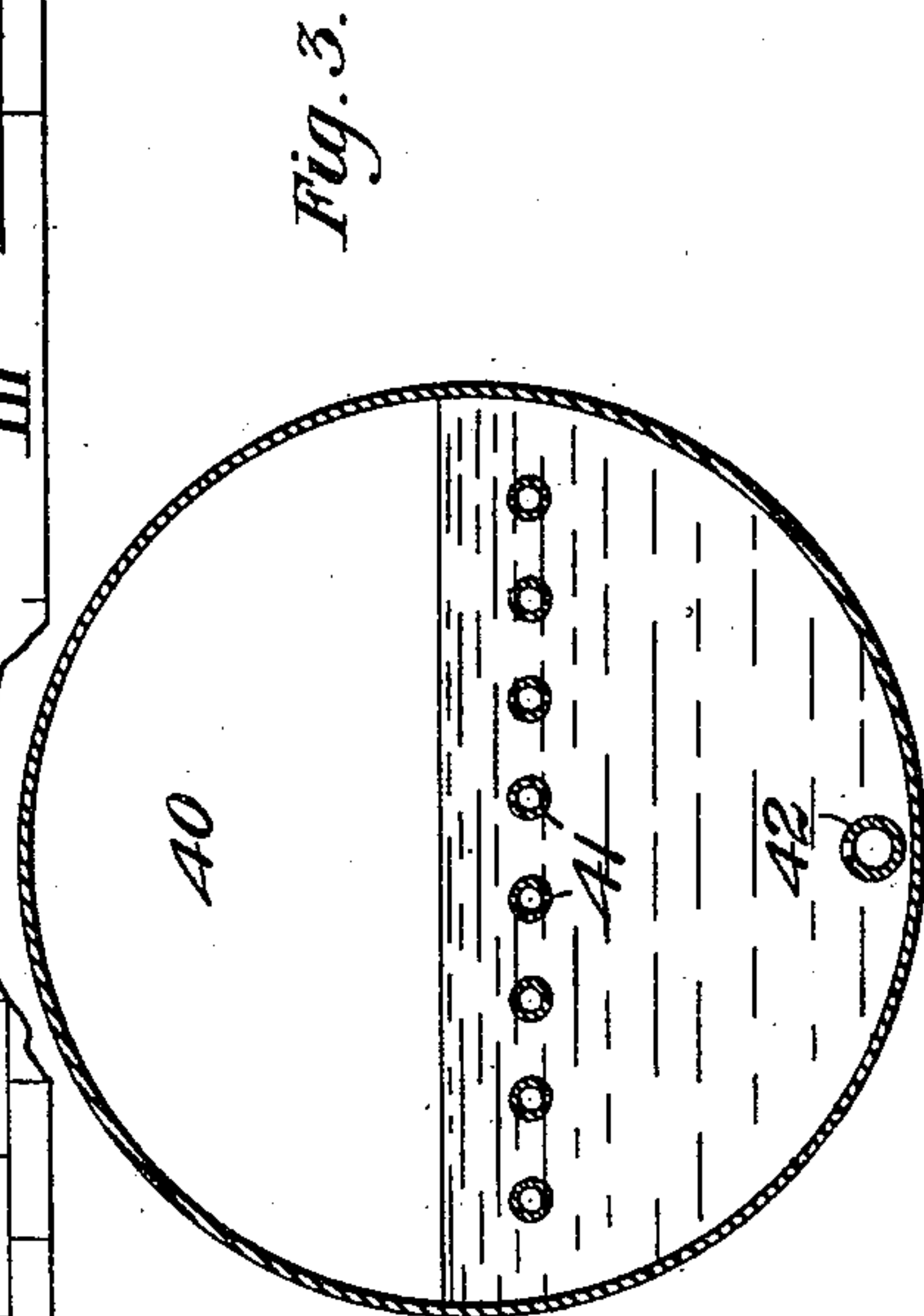
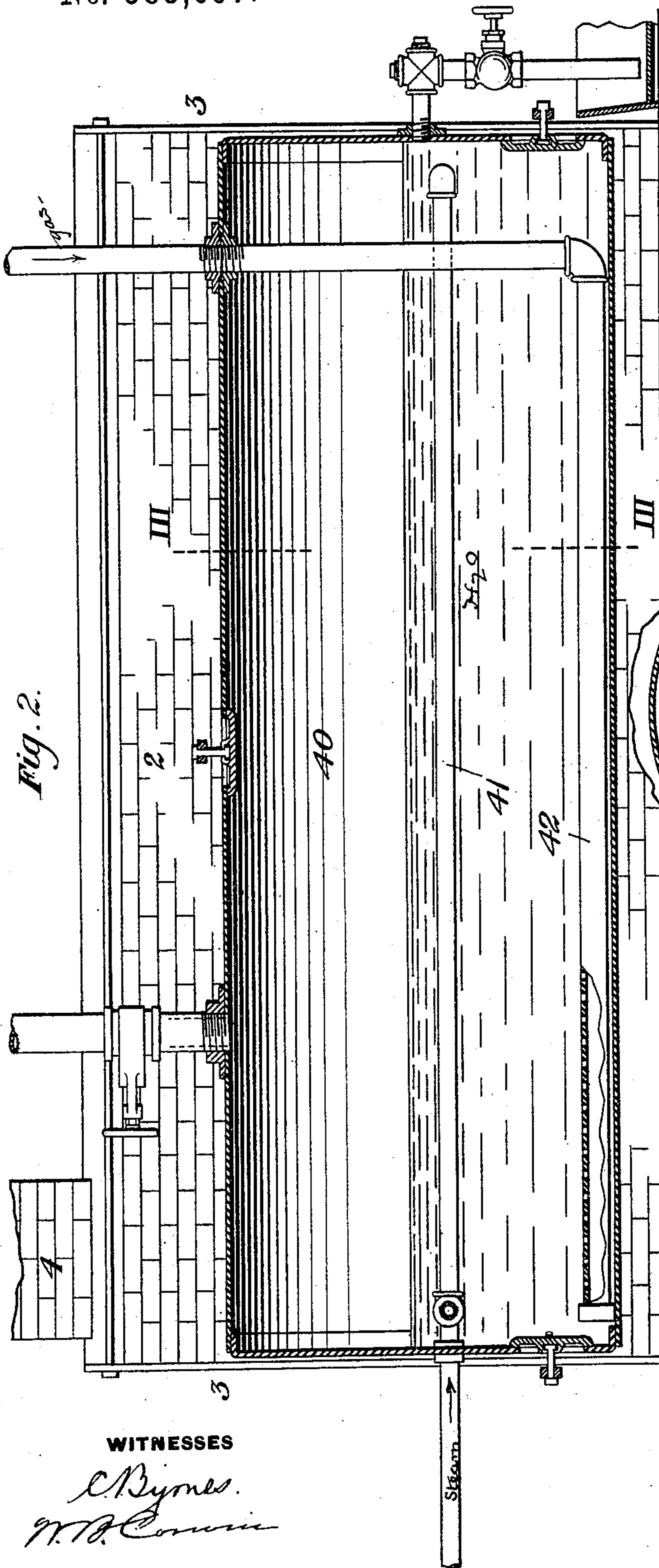
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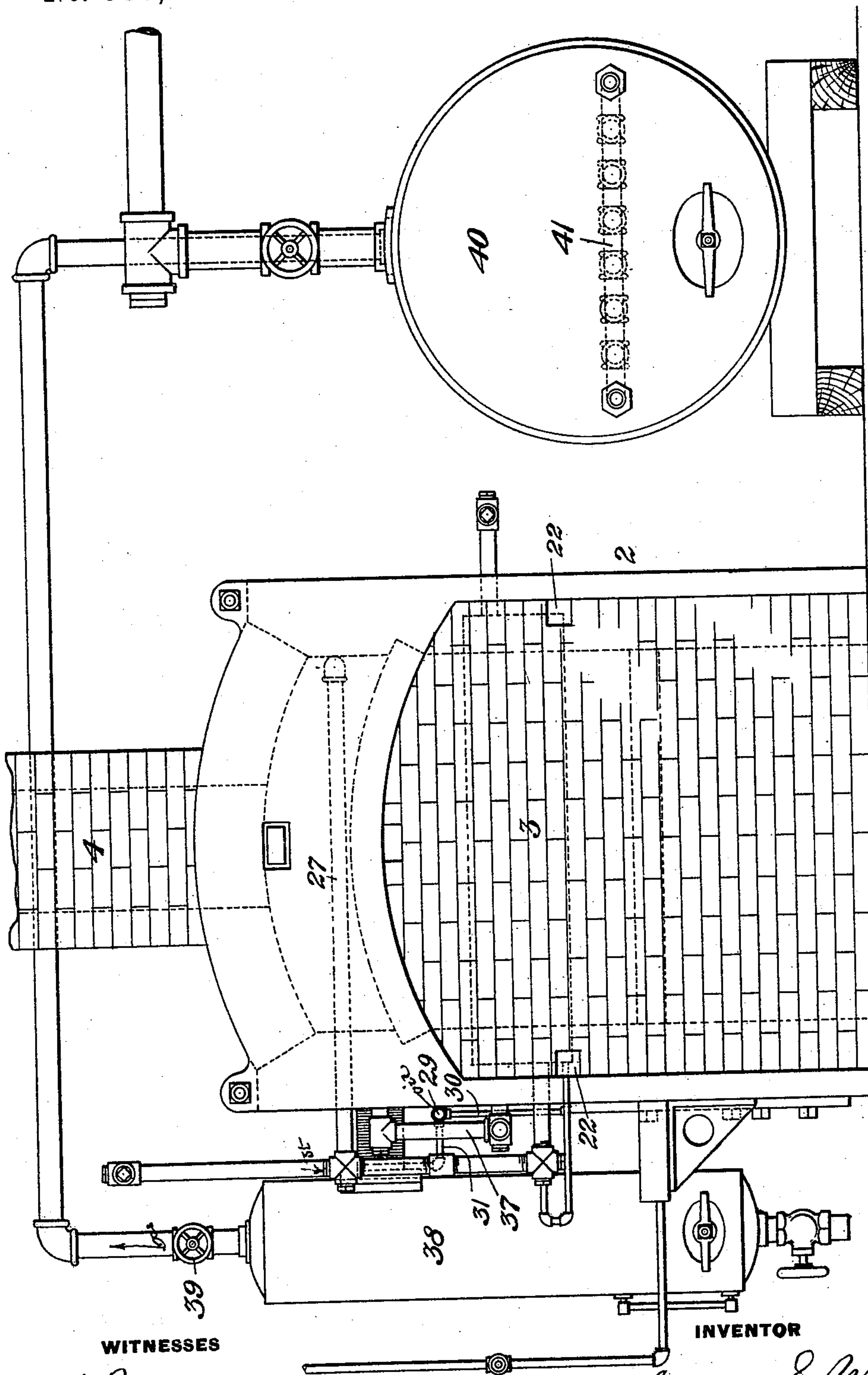
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WITNESSES

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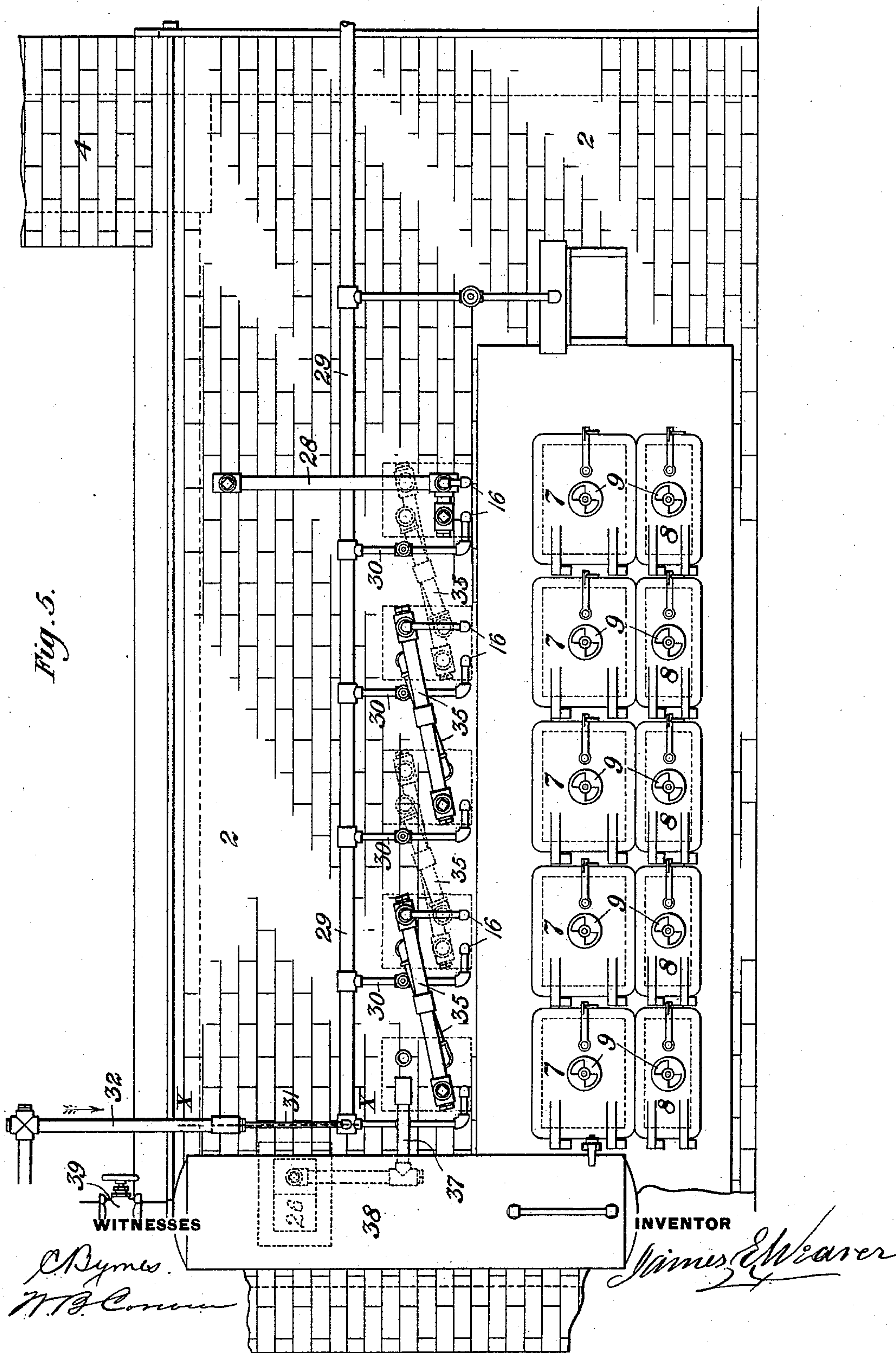
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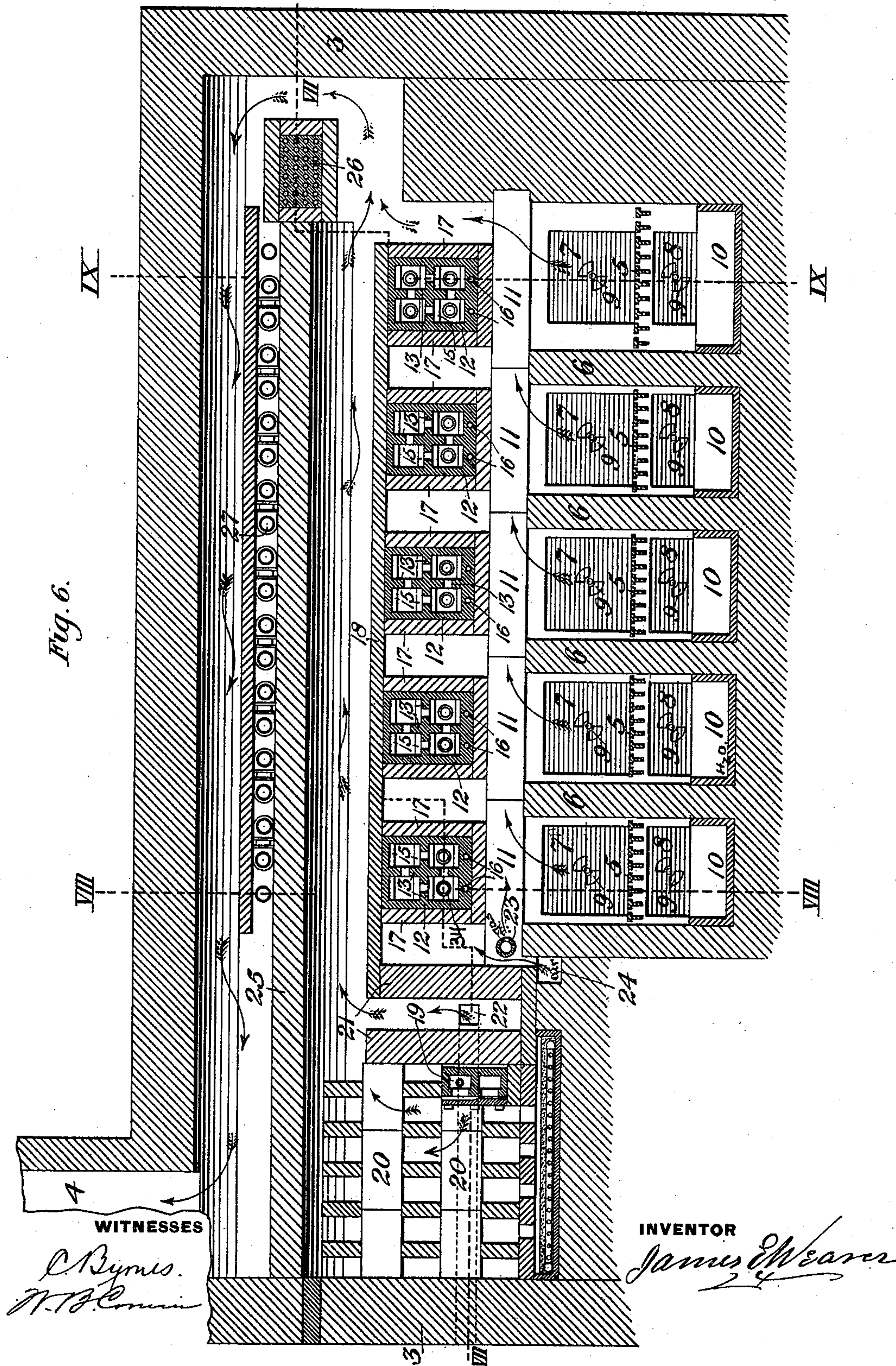
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Fig. 6.



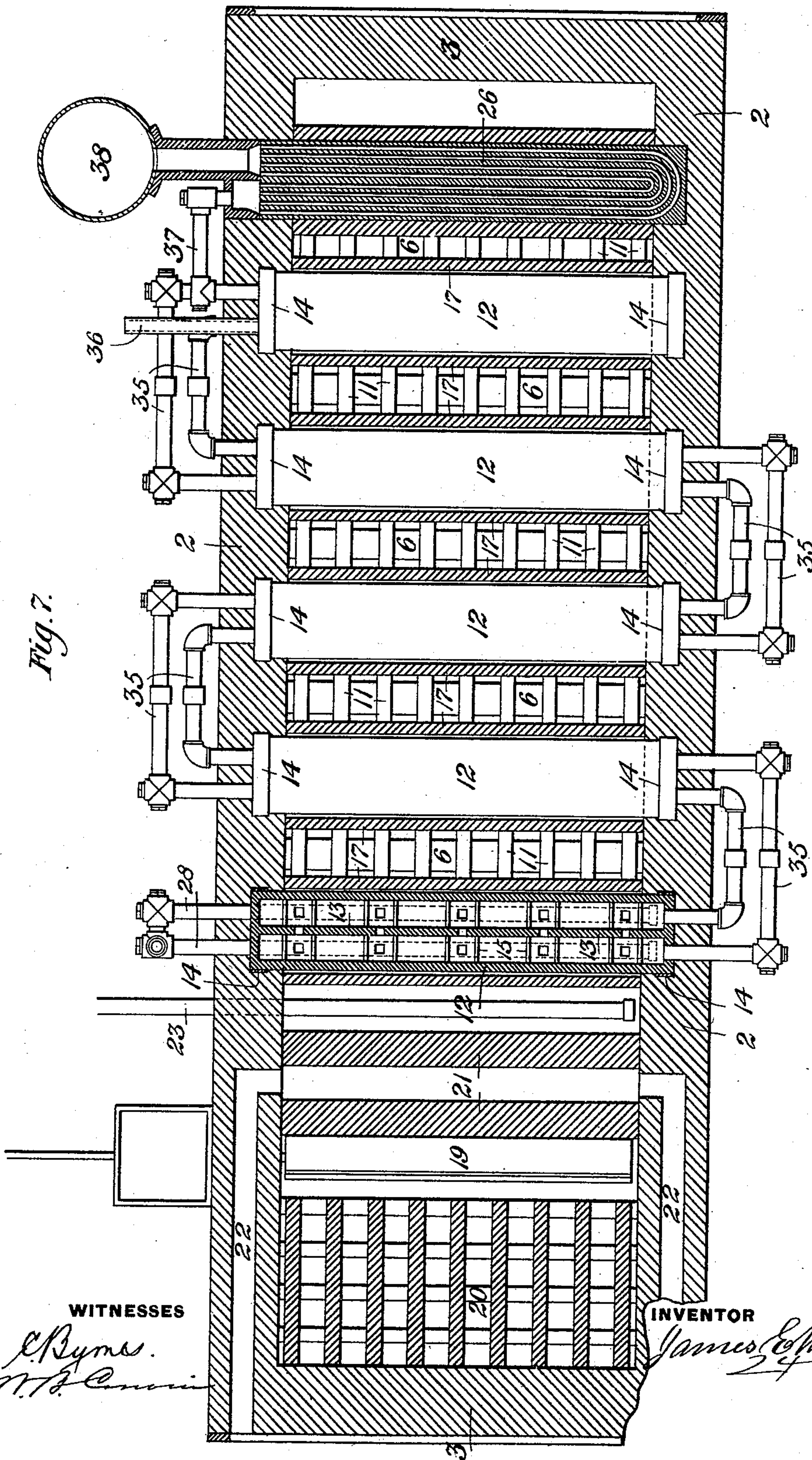
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WITNESSES

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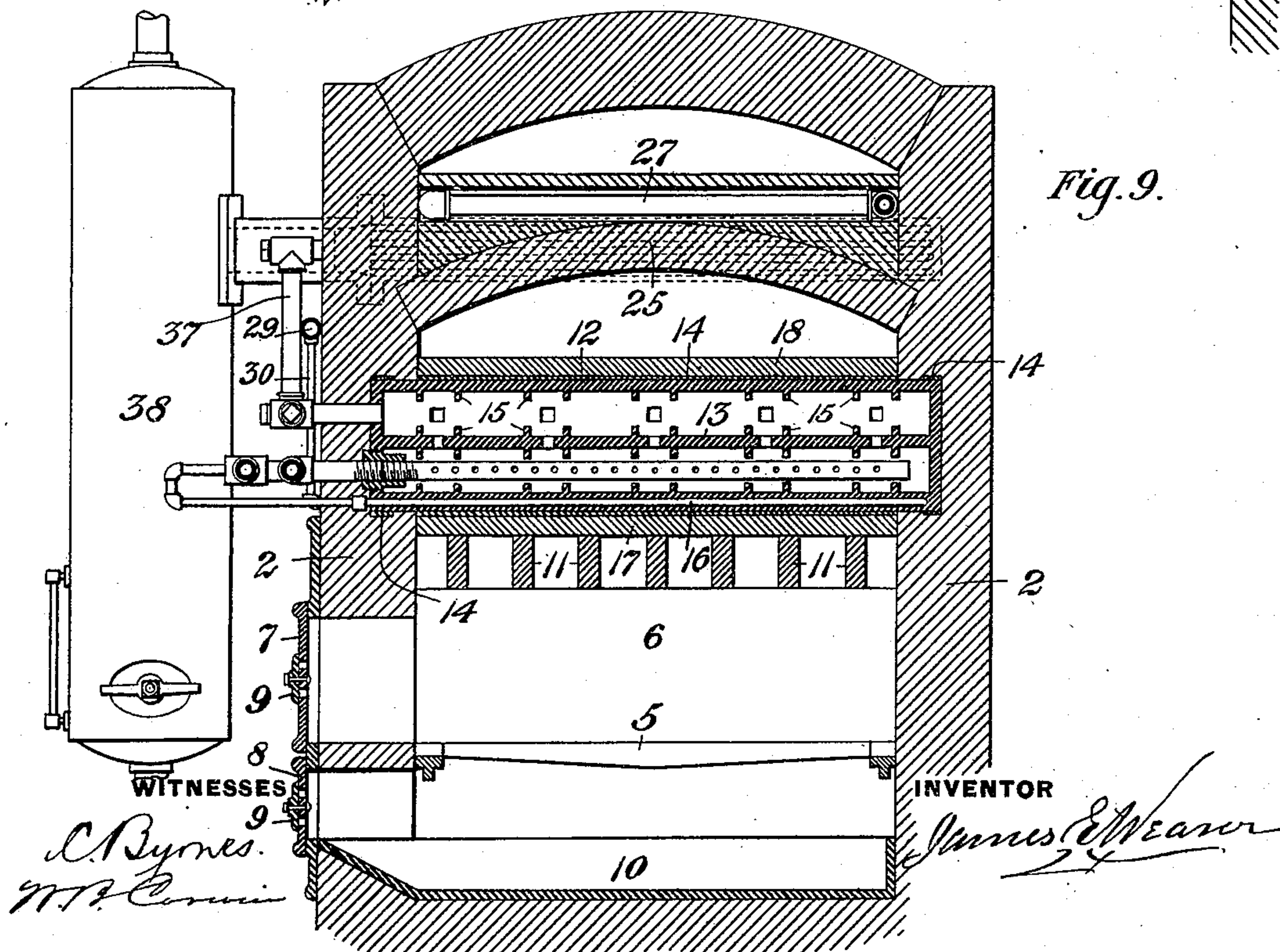
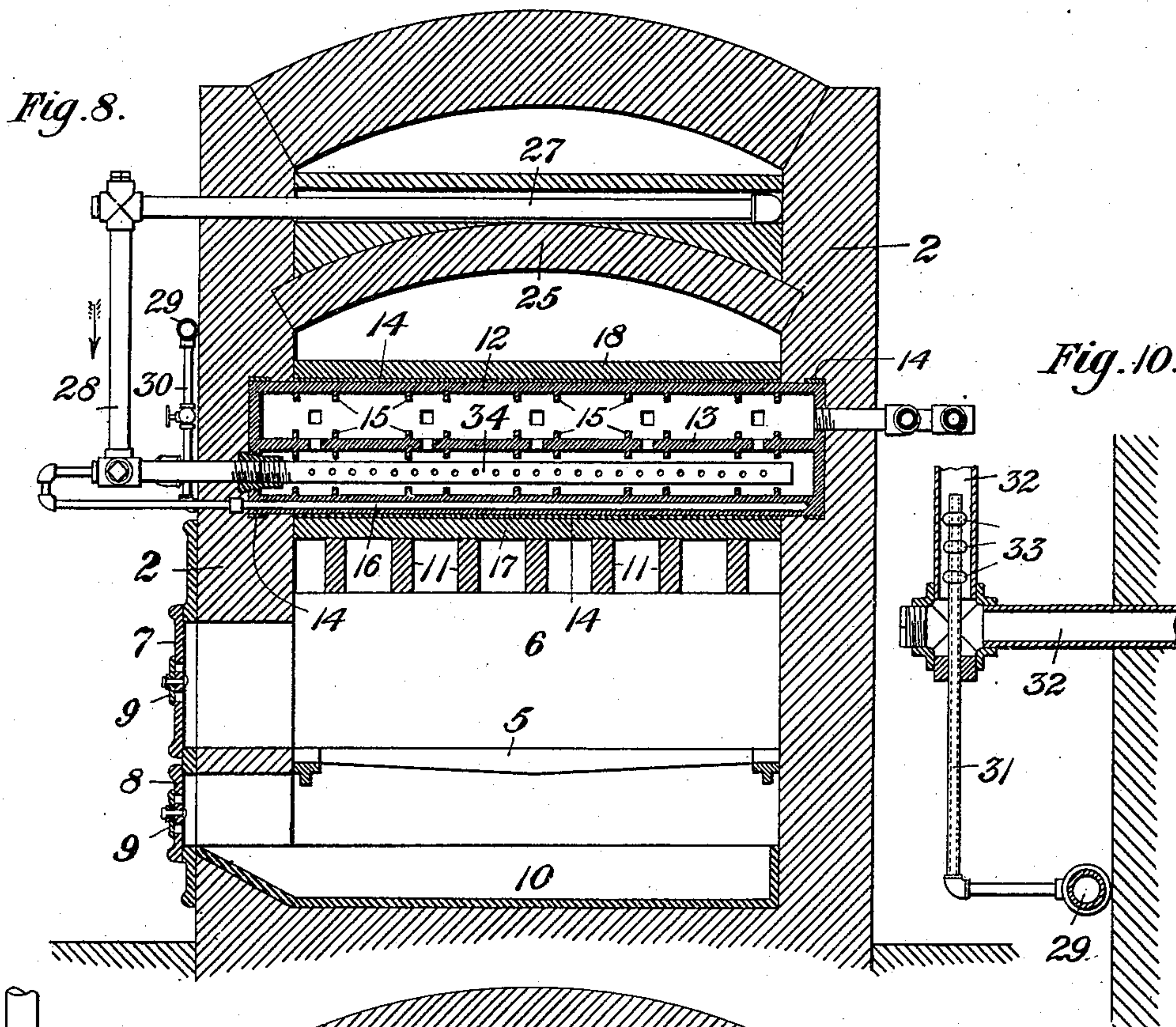
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UNITED STATES PATENT OFFICE.

JAMES E. WEAVER, OF PITTSBURG, PENNSYLVANIA.

GAS-MAKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 583,697, dated June 1, 1897.

Application filed August 10, 1893. Serial No. 482,822. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. WEAVER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Making Apparatus, 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 is a top plan view of my improved apparatus. Fig. 2 is a longitudinal sectional view of the scrubber I employ. Fig. 3 is a cross-section on the line III III of Fig. 2. Fig. 4 is a front elevation of the plant. Fig. 5 is a side elevation of the gas-making apparatus. Fig. 6 is a longitudinal sectional view of the same. Fig. 7 is a horizontal sectional view on the line VII VII of Fig. 6. Figs. 8 and 9 are cross-sectional views on the lines VIII VIII and IX IX, respectively, of Fig. 6. Fig. 10 is a detail view hereinafter referred to.

My invention relates to the manufacture of gas from oil, and is designed to attain an apparatus which shall produce a larger quantity of gas of greater heating capacity than has heretofore been possible.

In the drawings, in which like numerals indicate like parts, 2 2 indicate the side walls of the gas-making apparatus, 3 3 the end walls, and 4 a stack for the waste products of combustion from the grates 5. The grates 5 are separated from each other by the dividing-walls 6, and above and below each grate are provided two doors 7 and 8 in the side wall for the introduction of coke and the removal of ashes, these doors having the usual dampers 9. Beneath each grate is located a pan 10, arranged to hold water, and pipes or other suitable devices may be used to keep these pans filled. Upon the partition-walls 6 are supported the longitudinal tiles 11, between which are passages for the products of combustion from the coke upon the grates.

Upon the tiles 11 are supported the retorts 12, each of which consists of a hollow casting in the form of a square box, having longitudinal partition-walls 13, which divide its interior into four chambers and are perforated to allow communication between these chambers. To strengthen these retorts and

prevent their warping and bulging, I shrink around them a series of wrought-iron bands 14 for a major portion of their length, and preferably one also at each end. These bands greatly improve the retorts and lengthen their life.

The interior faces of each retort are provided with projecting ribs 15, which also strengthen the retort and between which any oil may settle and become vaporized. In the bottom of the retort is cast a wrought-iron return-pipe 16, through which oil or vapor may be forced and then passed into the retort to enrich the gas. Each retort is incased in tiles 17 on the bottom and two sides to prevent the flames and products from coming in direct contact therewith and burning out the same, and over the retorts extends a continuous cover or roof 18 of tiles. At one end of the setting is located a burner 19 and suitable checker-work 20, arranged in any desired manner. A hollow bridge-wall 21 is provided between this burner and the retorts, and air being led thereinto through passages 22 in the side walls becomes heated therein and, rising, mixes with the products and causes perfect combustion. A gas-pipe 23 opens beneath and at one end of the series of retorts, and below the same is an air-passage 24 to supply air thereto.

Whenever the coke is renewed upon the grates, gas being allowed to escape from pipe 23 is burned beneath the retorts, and thus a continuous even heat is preserved. An arch 25 extends above the retorts from the front end nearly to the rear, and at the rear end is supported a fixing-retort 26, consisting of a casting having a series of bent return-tubes therein, as shown in Fig. 7. This retort 26 is also incased in tiles and is surrounded by the outgoing waste products. Over the arch is carried a series of return-tubes 27, and the oil and steam enter the pipe nearest the retort 26 and, passing through the series of pipes, issue thence through pipe 28 into a perforated pipe in the lower portion of the retort nearest the bridge-wall.

29 represents the oil-feeding pipe, passing along the side of the furnace and having branch pipes 30, provided with suitable valves and leading to the pipes 16 in the bottom of the retorts. From its end leads the pipe 31,

Fig. 10, which passes through the bend of the steam-pipe 32 and terminates above this bend. The pipe 31 is provided with exterior rings 33, and the oil issuing therefrom is stripped backwardly over the rings by the steam and thoroughly mixed therewith and issues thence into the return-tubes 27, as shown in Fig. 4. From the end return-tube the mixture passes through pipe 28 into the perforated pipe 34 in the lower portion of the end retort, whence the mixture issues into the retort and immediately flashes into gas and rises into the upper chambers, whence it passes through inclined end pipes 35 into the lower chambers of the next retort, thence through similar pipes 35 at the other end to the adjoining retort, and so on to the end of the series.

Each retort is cast with four holes at each end, and the holes not employed for the connecting-pipes are closed by screw-plugs. I preferably use a sight-tube 36 to each retort, this tube fitting around the screw-plug and showing the heat of the retort by the color of the plug. By this means the heat of the retorts may be easily judged and regulated. From the last retort a pipe 37 leads the gas into the fixing-retort 26, and passing therethrough it issues into the reservoir 38. The single pipe 37 leads the gas from the decomposing-retorts to the fixing-retort, and hence a back pressure is induced within the retorts within which the gas expands, as the capacity of this pipe is less than that of the double pipes connecting the retorts. This is important, as it prevents oil being carried through the retorts into the reservoir by the swift current, which would occur if a large outlet were provided.

The pipe leading from the reservoir 38 to the scrubber is provided with a check-valve 39, so that a still more restricted passage is obtained and the current retarded, so as to deposit any oil within the reservoir, whence it is drawn off at the bottom.

The scrubber which I preferably employ is shown in Figs. 2 and 3, and consists of a horizontal cylinder 40, partially filled with water, which is kept at a temperature slightly above that of the external air by means of a coil of pipe 41, through which cold water is circulated, the gas entering through perforated pipe 42. The water is constantly changed by a suitable inlet and overflow pipe to prevent its getting stale.

The advantages of the apparatus are demonstrated in the large amount and superior character of the gas produced thereby, and as the retorts are protected the plant does not wear out soon or need frequent repairs.

Many changes may be made in the form and construction of the various parts without departing from my invention, since

What I claim is—

1. In gas-making apparatus, the combination with a series of grates, of a horizontal series of connected retorts above the same, a casing of refractory material for the sides and bottoms of the retorts, and a continuous roof of tiles covering all the retorts, an arch above the retort-roof, a series of heating-pipes carried thereon, and a connection between the heating-pipes and the retorts; substantially as described.

2. In gas-making apparatus, the combination with a series of grates, of a series of retorts above the same, a cover over the retorts, an arch above this cover, and a burner arranged to direct its products into the space between the cover and arch; substantially as described.

3. In gas-making apparatus, the combination with a series of grates, of a series of retorts above the same, a cover over the retorts, an arch above this cover, a burner arranged to direct its products into the space between the cover and arch, and a series of heating-pipes supported upon the arch; substantially as described.

4. In gas-making apparatus, the combination with a series of grates, of a series of retorts above the same, a cover over the retorts, an arch above this cover, a burner arranged to direct its products into the space between the cover and arch, a series of heating-pipes supported upon the arch, and a cover over these pipes; substantially as described.

5. In gas-making apparatus, the combination with a series of grates, of a series of retorts above the same, a cover over the retorts, an arch above this cover, a burner arranged to direct its products into the space between the cover and arch, and a fixing-retort at the end of the arch in the path of the products of combustion; substantially as described.

6. The combination with a series of retorts supported above grates, of an arch above the retorts and a heating-coil above the arch, an oil and steam mixing apparatus having a pipe leading into the heating-coil, a pipe connecting the coil and the retorts, an oil-supply pipe leading to the tubes cast in the bottom of the retorts, and connections between said tubes and the interior of the retorts; substantially as described.

7. The combination with grates, of a series of retorts supported above the same, an arch above the retorts, a fixing-retort at the end of the arch, a heating-coil upon the arch, connecting-pipes between the coil and the retorts, and a connection from the end retort to the fixing-retort; substantially as described.

In testimony whereof I have hereunto set my hand.

JAMES E. WEAVER.

Witnesses:

W. B. CORWIN,
C. BYRNES.