No. 805,489. PATENTED NOV. 28, 1905.

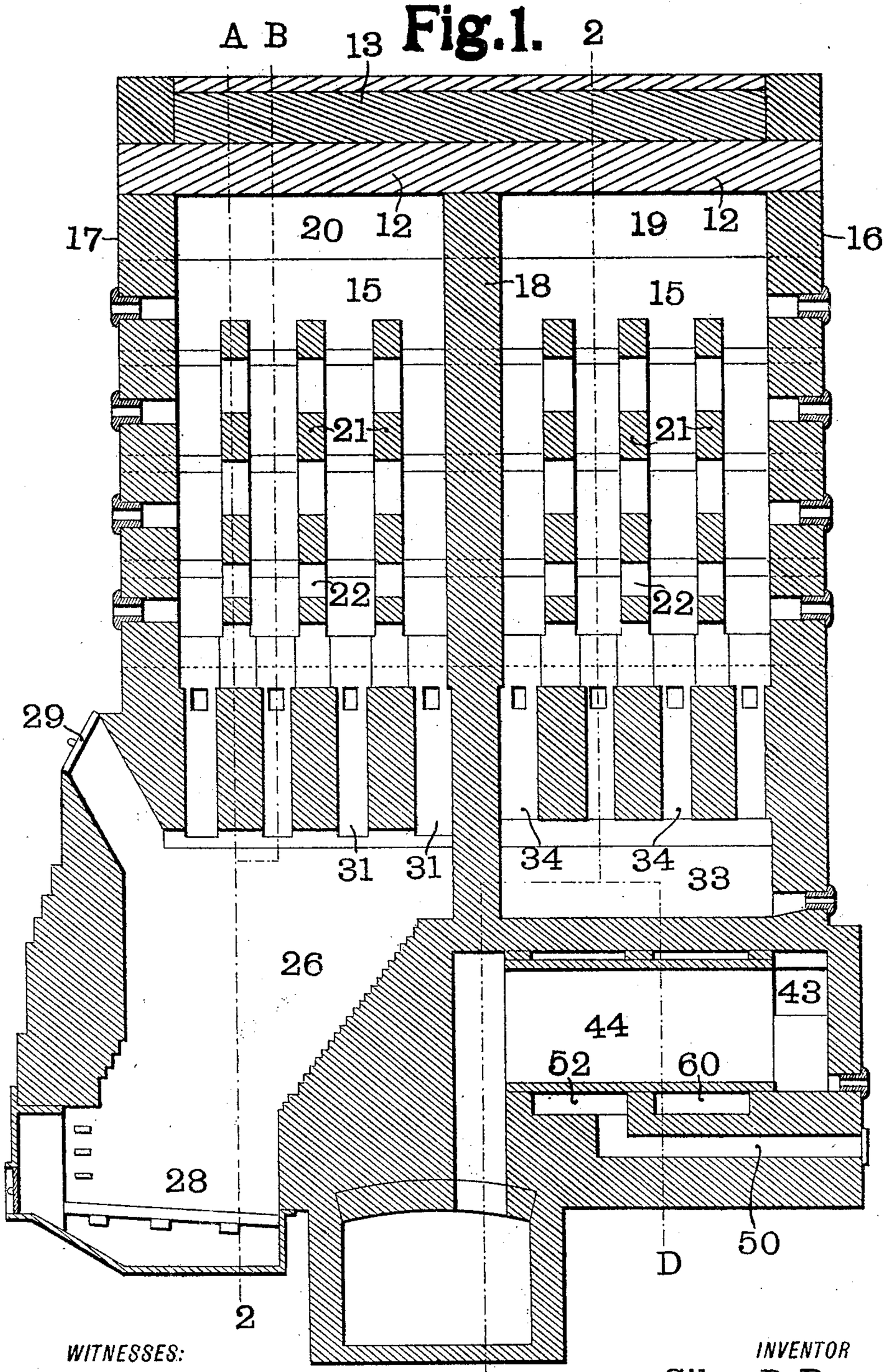
S. B. RUSSELL.

GAS RETORT BENCH.

APPLICATION FILED MAY 22, 1905.

4 SHEETS—SHEET 1.

Fig. 1.



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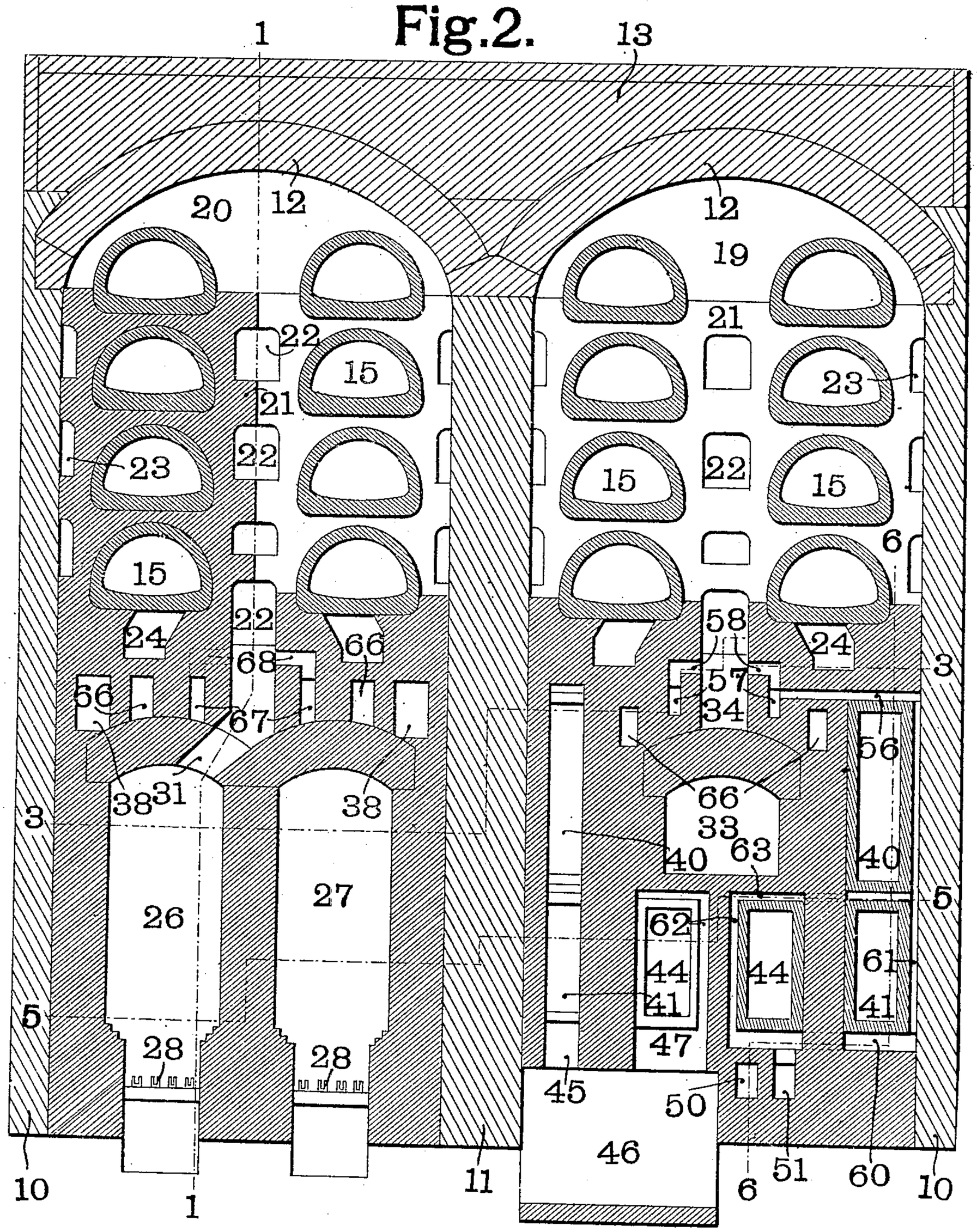
4 SHEETS—SHEET 2.

Fig.2.



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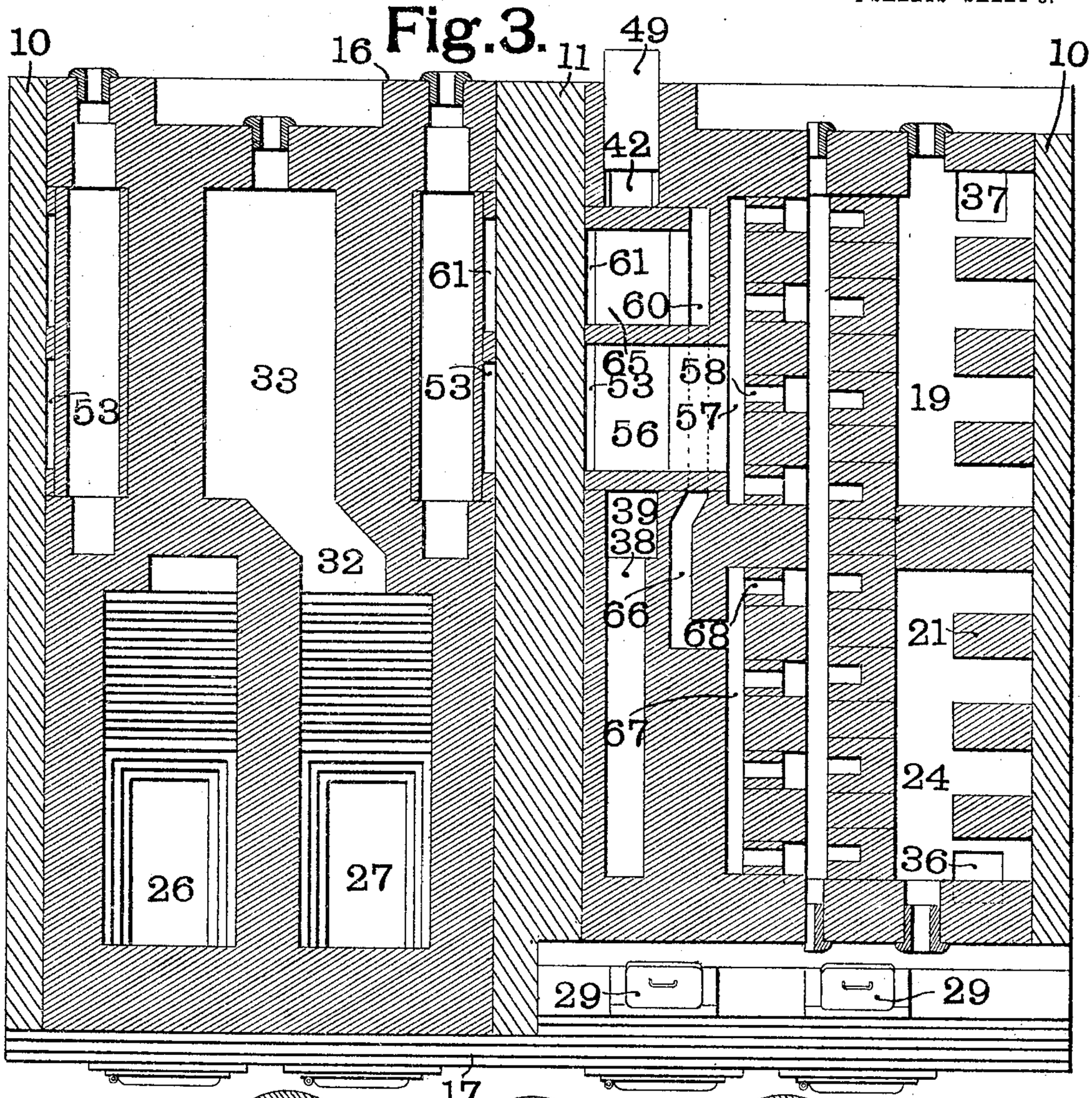
4 SHEETS—SHEET 3.

Fig.3.



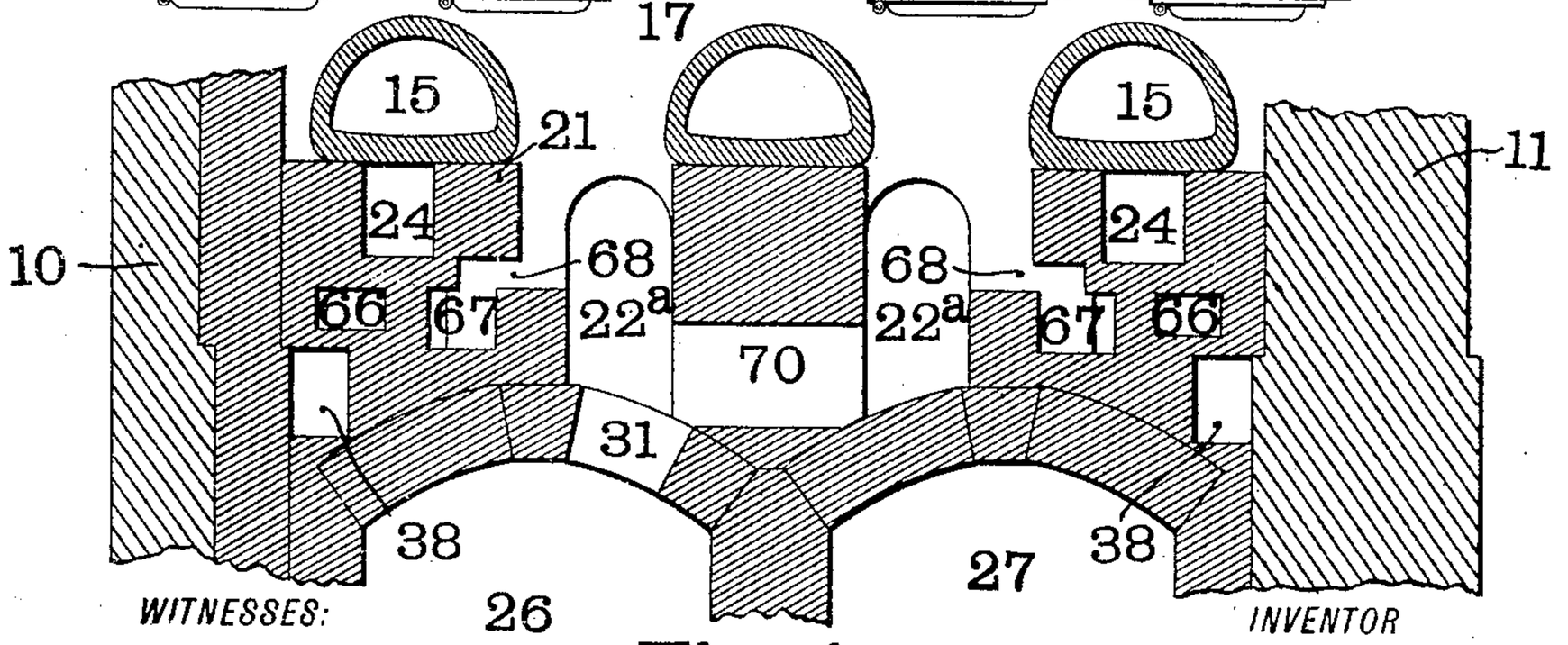


Fig.4.

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4 SHEETS—SHEET 4.

Fig.5.

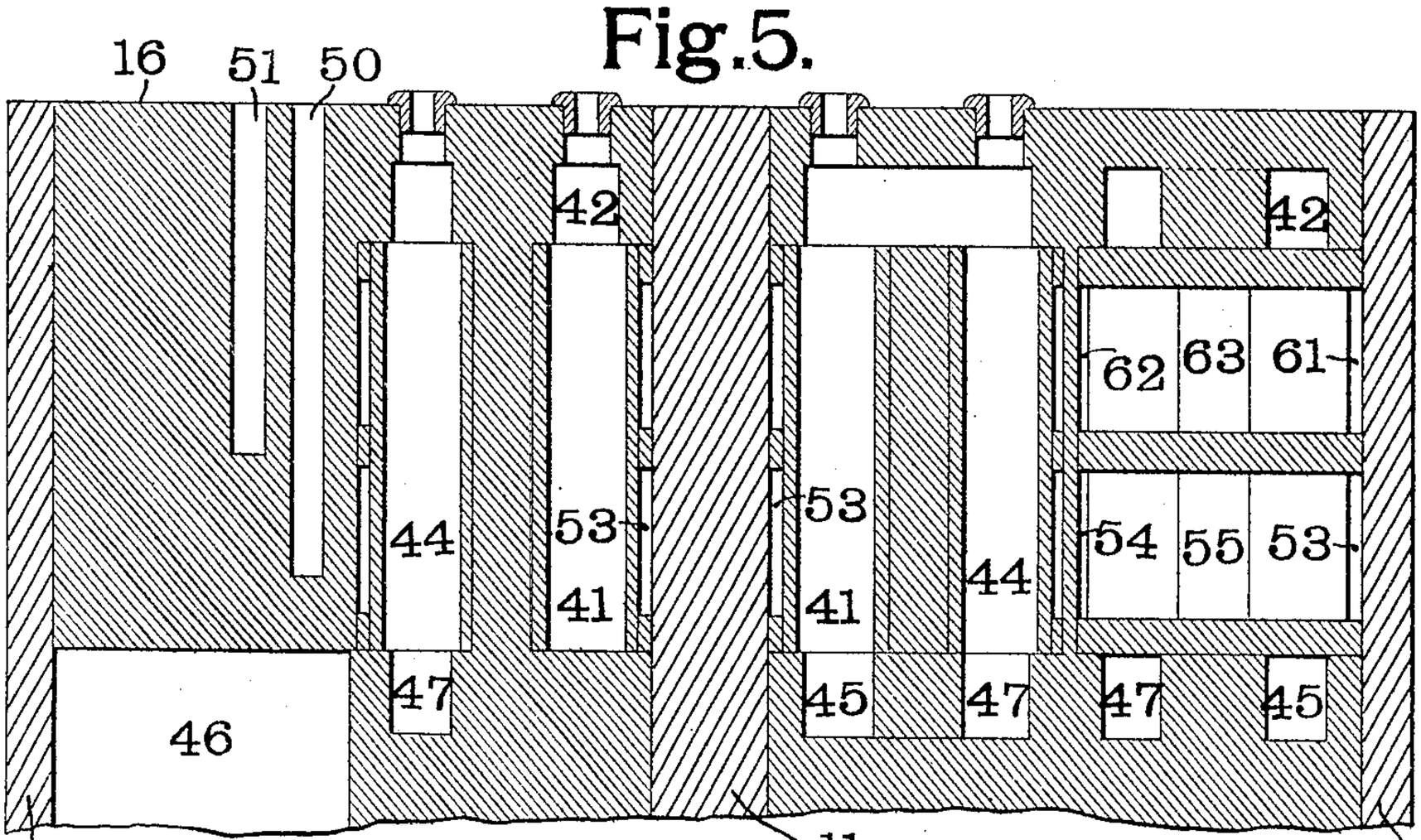
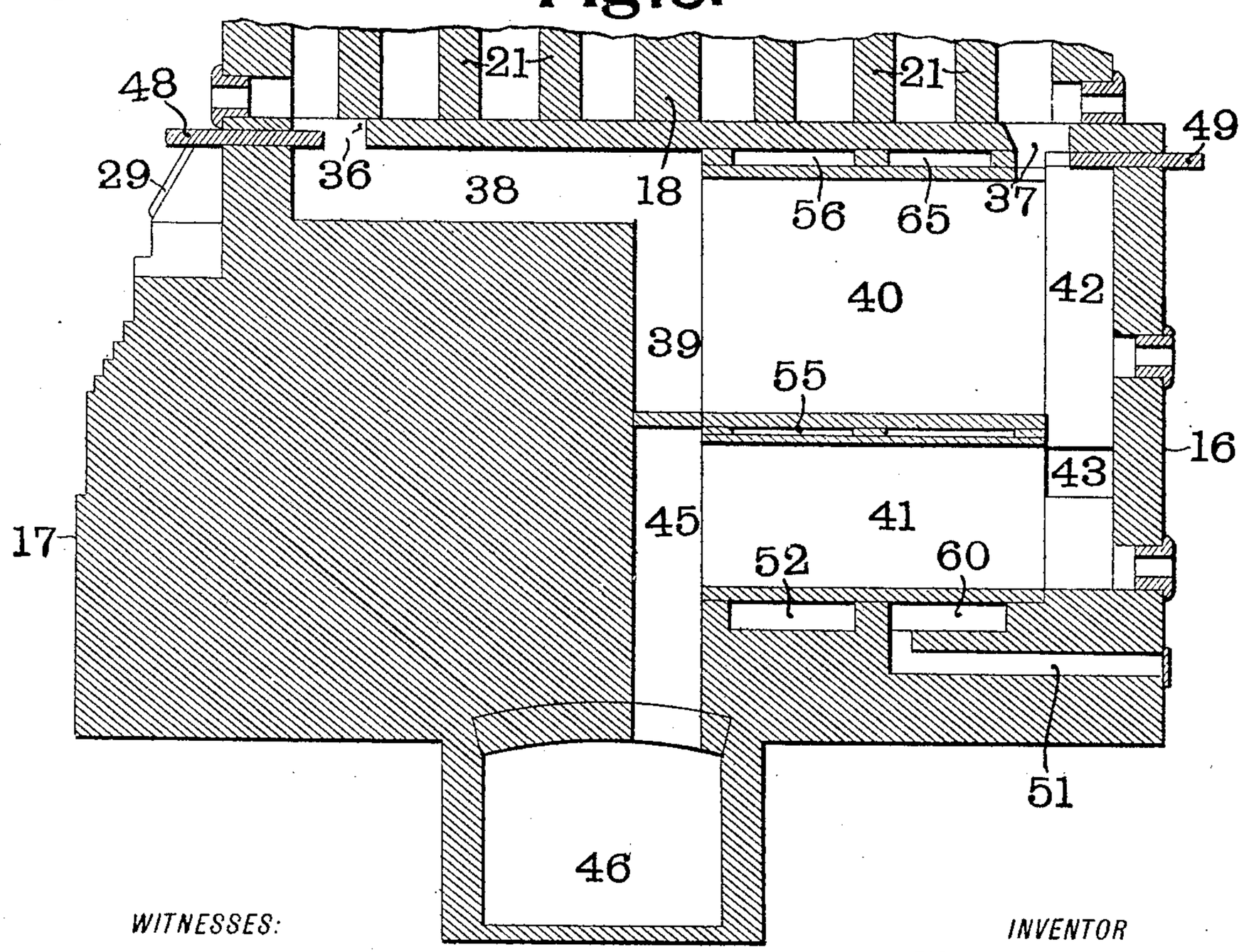


Fig.6.



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GAS-RETORT BENCH.

No. 805,489. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed May 22, 1905. Serial No. 261,537.

To all whom it may concern:

Be it known that I, SILAS BENT RUSSELL, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Gas-Retort Bench, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The object of my invention is to provide a gas-retort bench in which one end of the retort is heated by one furnace and the other end by a separate furnace, both furnaces being arranged at the same end of the bench, and also to provide means for independently regulating the admission of heated air and gases to and the escape of the products of combustion from the two ends of the bench. By such construction long retorts can be effectively and uniformly heated, and the inconvenience of operating furnaces at both ends of the bench is obviated.

In the accompanying drawings, which illustrate a double-retort bench made in accordance with my invention, Figure 1 is a vertical longitudinal section taken on the line 1 1 of Fig. 2. Fig. 2 is a vertical cross-section, the left-hand side of which is taken on the lines 2^a 2^b and the right-hand side on the line 2^c 2^d of Fig. 1. Fig. 3 is a horizontal section taken on the line 3 3 of Fig. 2. Fig. 4 is a section through a portion of a single bench, showing a slight modification. Fig. 5 is a section through the rear part of the bench, taken on the line 5 5 of Fig. 2; and Fig. 6 is a vertical longitudinal section taken on the line 6 6 of Fig. 2.

Like marks of reference refer to similar parts in the several views of the drawings.

10 represents the two side walls, and 11 the dividing-wall which separates the two benches.

12 represents the arches or roofs of the two benches, and 13 is a suitable covering or filling for said arch, all of which parts may be of any usual construction.

15 represents the retorts. In the main figures of the drawings these retorts are shown as arranged in two vertical rows of four each. The retorts 15 extend entirely through the upper part of the bench from the rear or charging side 16 to the front or discharging side 17. The upper part of the bench is divided, by means of a partition-wall 18, into a rear combustion-chamber 19 and front combustion-chamber 20. In addition to the partition-wall 19 the retorts 15 are provided with supporting-walls 21. These walls 21 are provided with central passages 22 and side passages 23, so as to allow the free circulation of the heated gases through the chambers 19 and 20. It will be understood, however, that the wall 18 is imperforate, so as to entirely prevent the communication of the gases from one chamber to the other. In addition to the passages 22 and 23 the walls 21 are also preferably provided with longitudinal passages 24 below each of the lower retorts 15.

26 and 27 are the furnaces, which are arranged at the front or discharge side of the bench. The furnaces 26 and 27 are each provided with a suitable grate 28, and each is provided with a charging-opening 29, so arranged that the coke when discharged from the retorts 15 can be readily fed into the said charging-opening 29. The furnaces 26 and 27 are constructed in the usual manner, so as to act as gas-generators. The furnace 26 at one side of each bench communicates by means of a substantially vertical passage 31 with the front combustion-chamber 20, while the furnace 27 at the other side of the bench communicates, through a passage 32, with a chamber 33 in the rear end of the bench, which chamber 33 in turn communicates, through passages 34, similar to the passages 31, with the combustion-chamber 19 at the rear or charging side of the bench. The gases after commingling with the fresh-heated air, as will be hereinafter described, and circulating through the combustion-chambers 19 and 20 pass by way of the passages 24 to openings 36 and 37 in the bottom of the chambers 20 and 19, respectively. The products from the chamber 20 pass through the openings 36, and those from the chamber 19 through the openings 37, as shown in Figs. 3 and 6. The products of combustion after passing through the opening 36 pass rearwardly through a passage 38, and thence communicate, by means of a downwardly-extending passage 39, with a regenerator-flue 40. Below the regenerator-flue 40 is a second regenerator-flue 41. The

products of combustion from the chamber 19 after passing through the opening 37 pass down at the rear of the regenerator-flue 40 through a passage 42. Gases from the chambers 19 and 20 thus meet in the passage 42 and there divide, partly passing forward through the regenerator-flue 41 and partly crossing over through an opening 43, and thence forward through a second and inner regenerator-flue 44. The gases passing through the regenerator-flue 41 pass downwardly through a passage 45 into the outlet-passage 46, while those passing through the flue 44 pass downwardly through a passage 47 into the said outlet-passage 46. The openings 36 and 37, hereinbefore referred to, may be provided with dampers 48 and 49, respectively, as shown in Fig. 6.

In order to supply fresh superheated air to the combustion-chambers 19 and 20, I form in the rear and lower part of each side of each bench two air-inlet openings 50 and 51. The inlet 50 communicates with a passage 52, which extends below the regenerator-flues 41 and 44. The air passing through this passage 52 divides and partly passes upwardly through a passage 53 at the outside of the regenerator-flues 40 and 41 and partly through a passage 54 at the inside of the regenerator-flue 44. That passing through the flue 54, however, crosses over by means of a passage 55 above the regenerator-flues 44 and 41 and joins the passage 53. From the passage 53 the heated air passes through a passage 56, as shown in Fig. 3, and communicates with a passage 57, which in turn communicates through openings 58 with the various passages 54, which lead the gases from the furnace into the rear heating-chamber 19. The fresh-heated air is thus thoroughly commingled with the gases entering the heating-chamber 19. The air entering through the passage 51 follows a course similar to that taken by the air passing in through the opening 50. Upon entering it is led, by means of a passage 60, corresponding to the passage 52, to passages 61 and 62, corresponding to the passages 53 and 54. The air passing through the passage 62 crosses over by means of a passage 63, corresponding to the passage 55, and thus the air both from the passage 62 and 61 passes up through the passage 61 and crosses over the regenerator-flue 40 by means of a cross-passage 65, corresponding to the cross-passage 56, hereinbefore described. In this case, however, it is necessary for the air to pass below the cross-passage 56. This is accomplished by means of a passage 66, as best shown in Fig. 3. The passage 66 after passing under the passage 56 again rises to the same level and communicates with the passage 67, which in turn communicates, by means of passages 68, with the vertical flues 31, leading into the combustion-chamber 20, so that the air passing in through the inlet-opening 51 is commingled with the gases entering the combustion-chamber 20.

In Fig. 4 I have shown a slight modification in which in place of two vertical rows of retorts three such vertical rows or retorts are used. In the figure, however, only the lower retort of each row is shown. In this construction the passage 24 is omitted from beneath the central retort 15. The principal difference in this construction from that previously shown is that in place of the central opening 22 through the partition-walls 21 two such openings 22[a] are provided, one at each side of the central retort 15. In order to provide communication between the two longitudinal passages thus formed, I provide cross-passages 70, so that the products of combustion from the vertical passage 31 can readily communicate with both the longitudinal passages formed by the openings 22[a].

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a gas-retort bench, the combination with a pair of combustion-chambers, one arranged at each end of the bench, of retorts passing through both of said combustion-chambers, a pair of furnaces arranged at one end of said bench, a communication leading from one of said furnaces to one of said combustion-chambers, and a communication extending from the other of said furnaces to the other of said combustion-chambers.

2. In a gas-retort bench, the combination with a pair of combustion-chambers, one arranged at each end of the bench, of retorts passing through both of said combustion-chambers, a pair of furnaces arranged at one end of said bench, a communication leading from one of said furnaces to one of said combustion-chambers, a communication leading from the other of said furnaces to the other of said combustion-chambers, and means for independently regulating the escape of gases from said combustion-chambers.

3. In a gas-retort bench, the combination with a pair of combustion-chambers, one arranged at each end of the bench, of retorts extending through both of said combustion-chambers, a pair of furnaces arranged at one end of said bench, a communication between one of said furnaces and one of said combustion-chambers, a communication between the other of said furnaces and the other of said combustion-chambers, and a common outlet for said combustion-chambers.

4. In a gas-retort bench, the combination with a pair of combustion-chambers, one arranged at each end of the bench, of retorts extending through both of said combustion-chambers, a pair of furnaces arranged at one end of said bench, a communication between one of said furnaces and one of said combustion-chambers, a communication between

the other of said furnaces and the other of said combustion-chambers, a common outlet for said combustion-chambers, and means for independently regulating the escape of gases from said combustion-chamber to said outlet.

5. In a gas-retort bench, the combination with a pair of combustion-chambers, one arranged at each end of the bench, of a pair of furnaces arranged at the discharge end of the bench, a communication between one of said combustion-chambers and one of said furnaces, and a communication between the other of said combustion-chambers and the other of said furnaces.

6. In a gas-retort bench, the combination with a pair of combustion-chambers, one arranged at each end of the bench, of retorts passing through both of said combustion-chambers, a pair of furnaces arranged at one end of said bench, a communication leading from one of said furnaces to one of said combustion-chambers, a communication leading from the other of said furnaces to the other of said combustion-chambers, means for independently regulating the escape of gases from such combustion-chambers, regenerator-flues communicating with said combustion-chambers, and air-conduits adjacent to said regenerator-flues and discharging into said combustion-chambers.

7. In a gas-retort bench, the combination with a pair of combustion-chambers, one arranged at each end of the bench, of retorts extending through both of said heating-chambers, a pair of furnaces, communications between one of said combustion-chambers and one of said furnaces, communications between the other of said combustion-chambers and the other of said furnaces, regenerator-flues communicating with said combustion-chambers, and air-conduits adjacent to said regenerator-flues and discharging into said combustion-chambers.

8. In a gas-retort bench, the combination with a pair of combustion-chambers, one arranged at each end of the bench, of retorts extending through both of said combustion-chambers, a pair of furnaces arranged at one end of said bench, communications between one of said furnaces and one of said combustion-chambers, communications between the other of said furnaces and the other of said combustion-chambers, regenerator-flues communicating with said combustion-chambers, a set of air-passages adjacent to said regenerator-flues and communicating with one of said combustion-chambers, and a second set of air-flues adjacent to said regenerator-flues and communicating with the other of said combustion-chambers.

In testimony whereof I have hereunto set my hand and affixed my seal in the presence of the two subscribing witnesses.

SILAS BENT RUSSELL. [L. S.]

Witnesses:

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BENNETTE PIKE.