

No. 785,418.

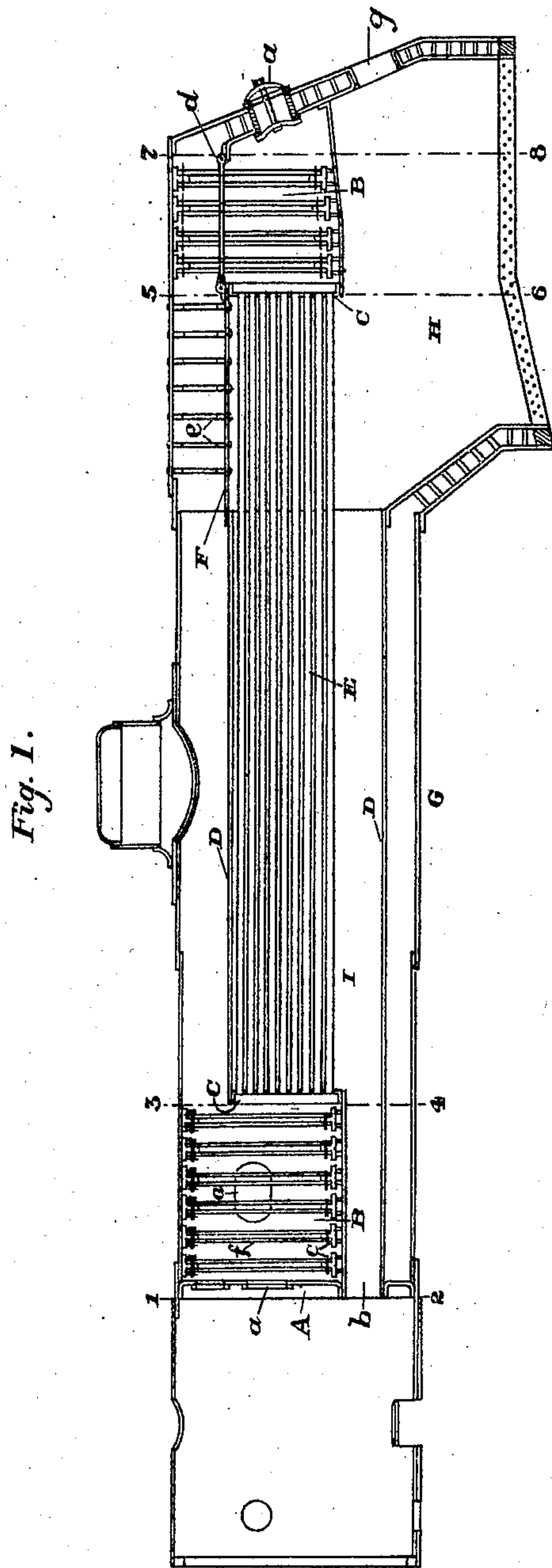
PATENTED MAR. 21, 1905.

J. S. GLENN & H. HENKE.

FIRE BOX BOILER.

APPLICATION FILED MAR. 28, 1904.

2 SHEETS--SHEET 1



Witnesses.
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2 SHEETS—SHEET 2.

Fig. 2.

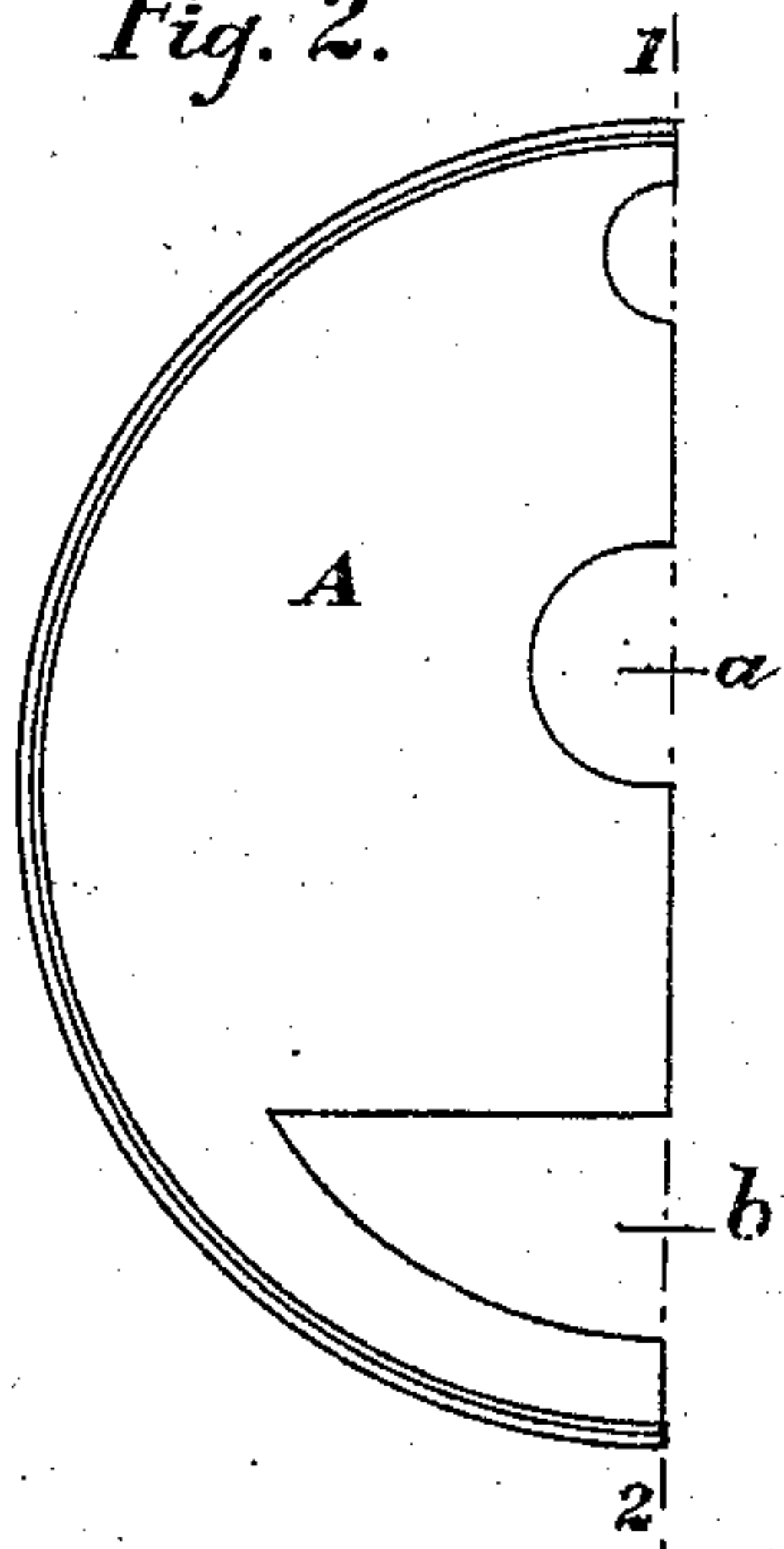


Fig. 3.

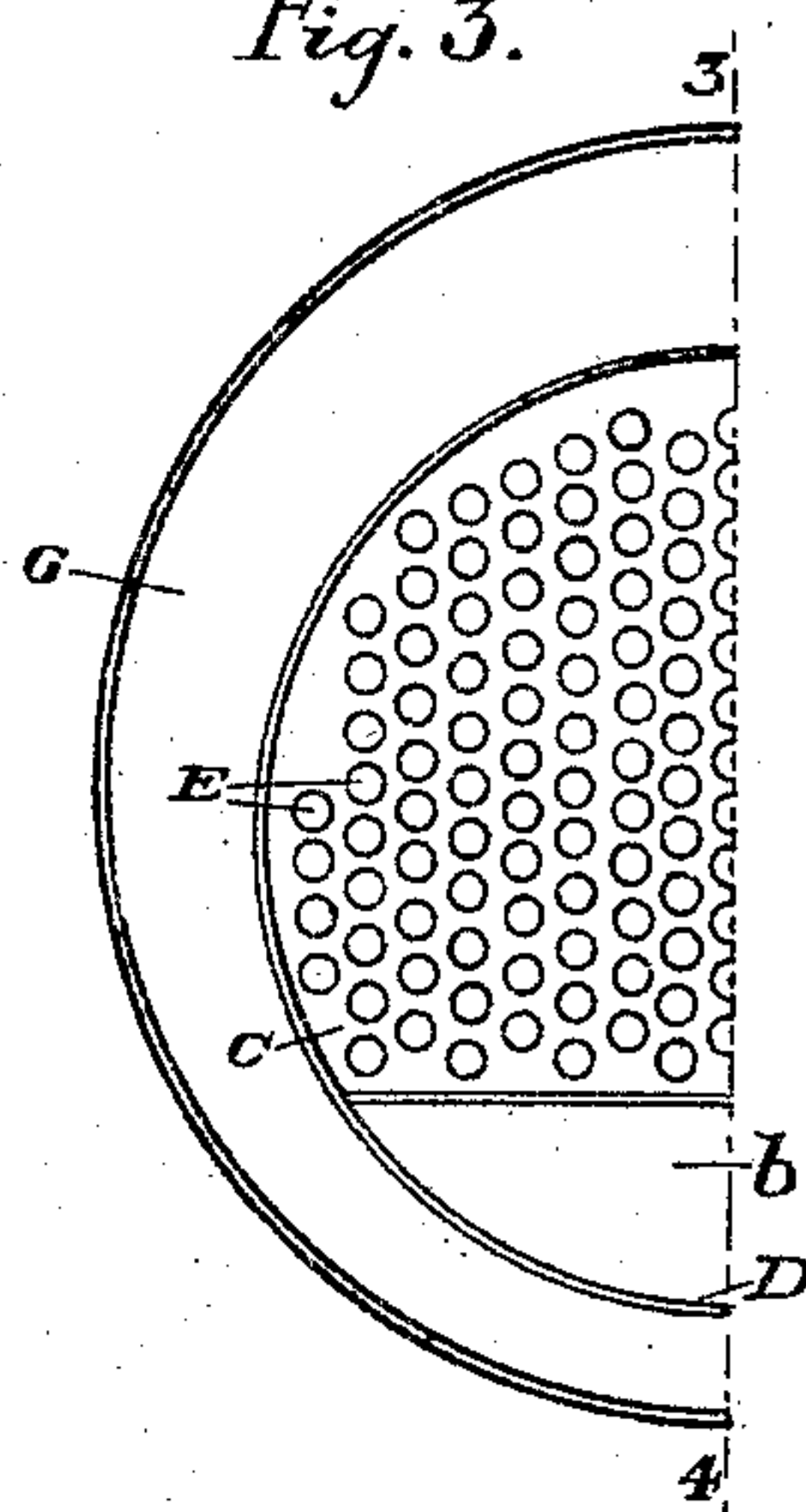


Fig. 4.

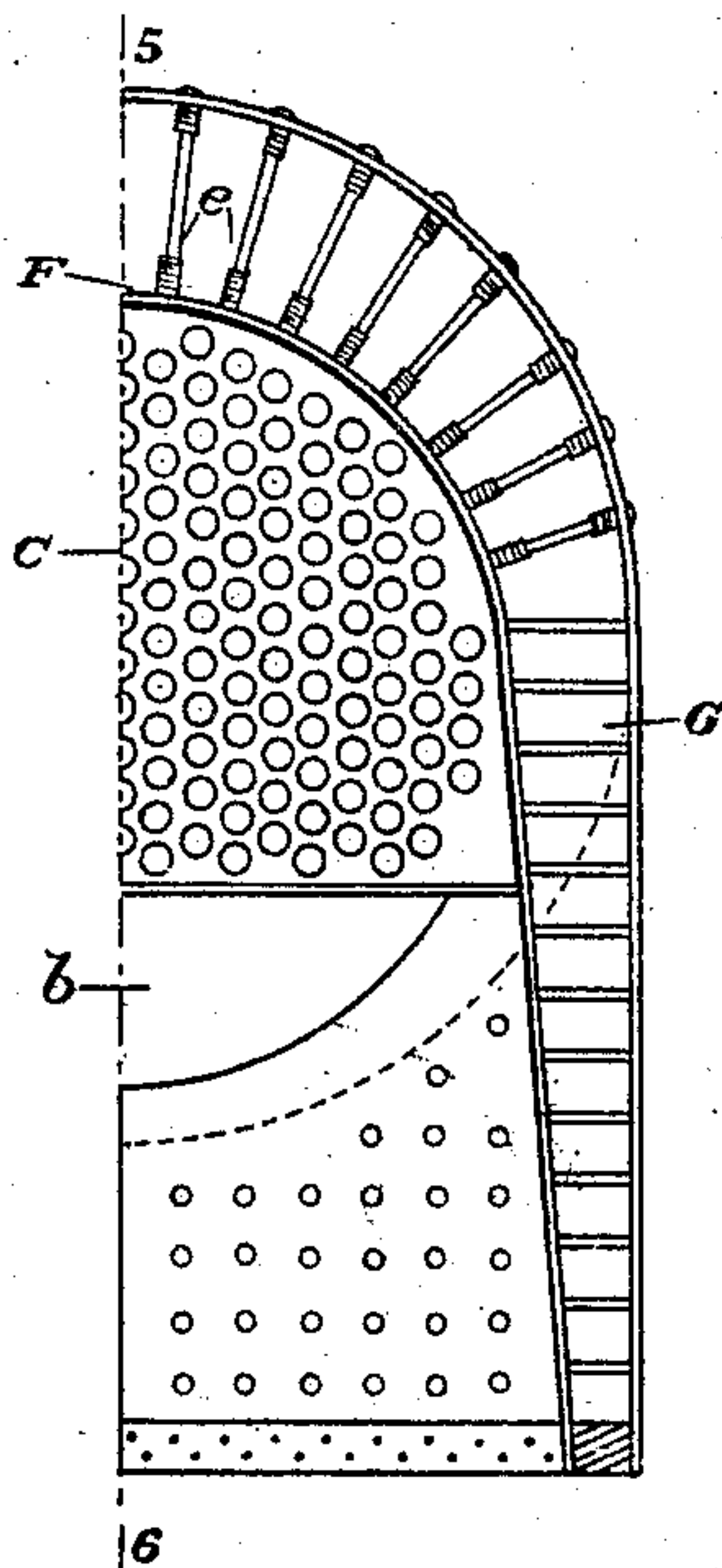


Fig. 5.

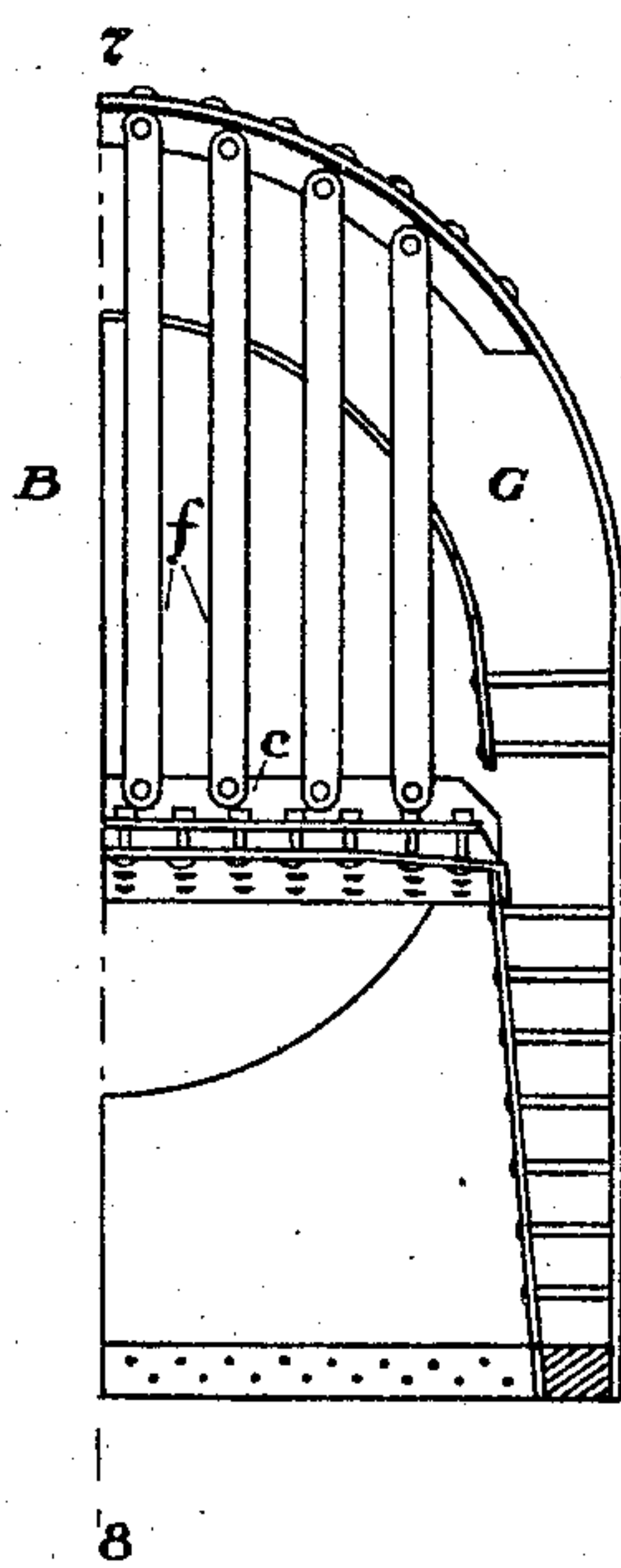
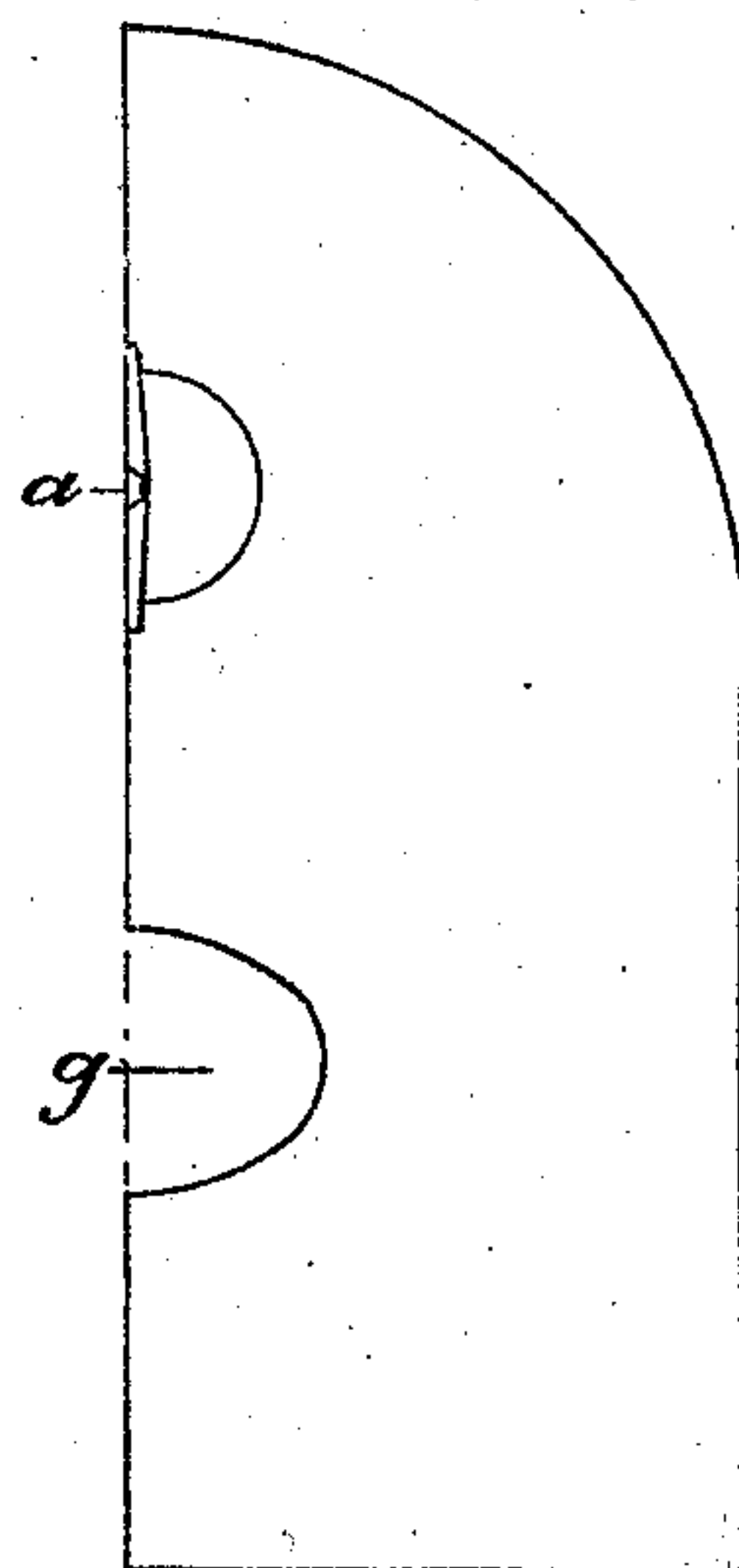


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN S. GLENN, OF WEST COVINGTON, KENTUCKY, AND HARRY HENKE,
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FIRE-BOX BOILER.

SPECIFICATION forming part of Letters Patent No. 785,418, dated March 21, 1905.

Application filed March 28, 1904. Serial No. 200,317.

To all whom it may concern:

Be it known that we, JOHN S. GLENN, residing at West Covington, in the county of Kenton and State of Kentucky, and HARRY HENKE, residing at Cincinnati, in the county of Hamilton and State of Ohio, citizens of the United States, have invented certain new and useful Improvements in Locomotive-Boilers, of which the following is a specification.

Our invention relates to locomotive-boilers.

The object of our invention is to so construct and arrange the interior of the boiler as to render it more economical to construct and maintain, safer, and more economical in use of fuel, whereby steam is more rapidly generated and there is less danger of leakage.

Our invention consists in providing a water-space in the boiler, with entry-chambers at each end thereof, connecting said chambers with a series of horizontal water-tubes within the flue-chamber, communicating with and receiving heat from the fire-box, which is adapted to communicate heat to the water within said tubes and water-space.

Our invention also consists in the details of construction and in the combination and arrangement of the several parts.

In the drawings, which serve to illustrate our invention, Figure 1 is a longitudinal section of a locomotive-boiler and fire-box, showing our invention. Fig. 2 is a vertical section of front head of boiler on line 1 2, Fig. 1. Fig. 3 is a vertical section of tube-sheet on line 3 4, Fig. 1. Fig. 4 is a vertical section of tube-sheet on the line 5 6, Fig. 1. Fig. 5 is a vertical section of fire-box on the line 7 8, Fig. 1. Fig. 6 is a section of rear head of boiler.

Similar letters refer to similar parts throughout the several views.

Our invention is preferably constructed substantially as shown, and the parts comprising it may be substituted for the construction and arrangement now generally used in locomotive-boilers. In such constructions with our invention installed therein as shown the usual boiler-shell is employed. This is provided at the front end with head A, having suitable manhole *a*. We provide a water-space G, ex-

tending around the boiler and fire-box within the shell, as shown, and at each end of said space an entry-chamber B is provided. These entry-chambers B are so constructed and arranged at each end of the boiler as to form receptacles for the water to enter and be heated when the boiler is in use and also serve as chambers for the workmen to enter for the purpose of securing a full set of water-tubes within the boiler and allowing sufficient space for the workmen to remove and replace water-tubes and otherwise repair and clean these parts. The rear chamber is arranged directly over the fire, and the front chamber is arranged directly over the flue-chamber, whereby intense heat is communicated directly to both entry-chambers, thus affording much more rapid generation of heat than otherwise. By constructing our entry-chambers B of a size large enough to admit a man therein a tube-sheet sufficiently large to receive a full set of water-tubes can be used at each end. One object of these entry-chambers is to permit the insertion or removal or repairing and the like of the tubes regardless of the location of the fire-door, whether high or low. The upper part of the water-space is larger in cross-section than at the sides and bottom to provide adequate steam-space.

The flue-chamber I, which extends longitudinally through the central part of the boiler from the fire-box H to the smoke-passage *b*, is separated from the water-space by the wall D, crown-sheet F, and tube-sheets C C. Within the flue-chamber I we provide a series of tubes E, disposed horizontally and secured at each end to and through the tube-sheets C C and adapted to communicate with the entry-chambers B at each end. Sufficient space is provided between these tubes to allow free circulation of heat as it escapes from the fire-box. By securing the ends of the tubes E in the sheets C C, thus surrounded by water at each end, whereby overheating at the joints is prevented, we avoid the danger, expense, and inconvenience resulting from contraction and expansion, such as in the case of flue-pipes having such joints unprotected and exposed to the fire-box. By our construction and ar-

5 rangement the danger of leakage is reduced to a minimum. Convenient and easy access to the tubes E is obtained through the man-holes *a*, communicating with the large entry-

10 chambers B B at each end. The bottom sheets of both entry-chambers B B are stayed to the outer shell of boiler by the sling-stays *f*, attached to the T-bars *c*. The crown-sheet F is stayed to the outside

15 shell of boiler by the radial stays *e* and is also secured to door-sheet of fire-box by brace *d*. The door of the fire-box is indicated by *g*. It will be observed that heat is communi-

20 cated directly from the fire-box to the water space and tubes and also indirectly by rapid heating and circulation of the water through the tubes to all parts of the water-space, thus producing the requisite steam, with much less fuel and also less damage to the boiler than

25 otherwise. The smoke passes through the flue-chamber I, smoke-passage *b*, into the usual smoke-box, and out through the smoke-stack. (Not shown.)

30 Some of the advantages of our invention are protection of the water-tubes from contraction and expansion, the provision of entry-

35 chambers in each end to permit convenient and easy access of the workmen in cleaning and repairing the water-tubes and other parts of the boiler, easily - removable entry-cham-

40 bers, simplicity of arrangement of the water-tubes with relation to the entry-chambers for the convenient and easy removal of any one or all of them and replacing same, conven-

45 ience for thorough washing of tubes and chambers when necessary to wash boiler, utilization of practically all of the heat units, appli-

50 tion of heat to a much larger heating-surface, avoidance of choked and stopped tubes, heat-retainer, perfect draft, there being no obstruction of any kind, and elimination of rolling or calking of tubes each trip. We also secure a continuous circulation of water, the water passing through the tubes from fire-

55 box end to front entry-chamber, this action being produced by the more intense heat at the fire-box end.

60 In applying our invention to a boiler we make no change whatever in the outside shell other than in providing manholes.

We claim—

1. In a locomotive-boiler, a water-space provided with an entry-chamber at each end, water-tubes extending horizontally within the

65 boiler and communicating at each end with said entry-chambers, and a fire-box adapted to communicate heat to the water within the water-tubes and water-space.

3. In a locomotive-boiler having a shell and water-space within the same, a flue-chamber within said water-space having its outlet-passage below the front entry-chamber and leading to the smoke-box, water-tubes within said

70 flue-chamber, tube-sheets at each end of the water-tubes to secure same and separate flue-chamber and water-space at the ends, and a fire-box adjacent said water-tubes and water-space.

4. In a locomotive-boiler, a water-space around the outer part thereof provided with entry-chambers at each end, a flue-chamber extending between said entry-chambers and from the fire-box to the smoke-passage, wa-

80 ter-tubes extending horizontally in said flue-chamber connecting and communicating with each entry-chamber, a fire-box arranged under one entry-chamber and the adjacent ends of the water-tubes, a smoke-passage arranged

85 under the other entry-chamber and adapted to communicate with the smoke box and outlet.

5. In a locomotive-boiler, a water-space around the outer part thereof provided with entry-chambers at each end, a flue-chamber ex-

90 tending between said entry-chambers and from the fire-box to the smoke-passage, water-tubes extending horizontally in said flue-chamber connecting and communicating with each en-

95 try-chamber, a fire-box arranged under one entry-chamber and the adjacent ends of the water-tubes and smoke-passage arranged under the other entry-chamber and adapted to communicate with the smoke box and outlet and a vertical heat-retainer at the rear of the

100 front entry-chamber and within the flue-chamber.

6. In a locomotive-boiler, a water-space having entry-chambers at each end, a man-hole leading into each entry-chamber through

105 the end of the boiler, a flue-chamber extending horizontally through said water-space, a series of water-tubes secured at each end and communicating with the entry-chambers, and a fire-box adapted to communicate heat to

110 said water space and tubes respectively.

7. In a locomotive-boiler, a shell, a fire-box, a smoke-box, a flue-chamber extending and forming the only opening between said fire-

115 box and smoke-box, a water-space surrounding said flue-chamber within said shell, an entry-chamber forming part of said water-space in and above said flue-space adjacent said

120 smoke-box whereby said flue-space is contracted and a heat-retainer is formed therein, an entry-chamber forming part of said water-space in and above said fire-box, manholes communicating with said entry-chambers and a plurality of water-tubes connecting said en-

try-chambers through said flue-chamber.

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