(No Model.)

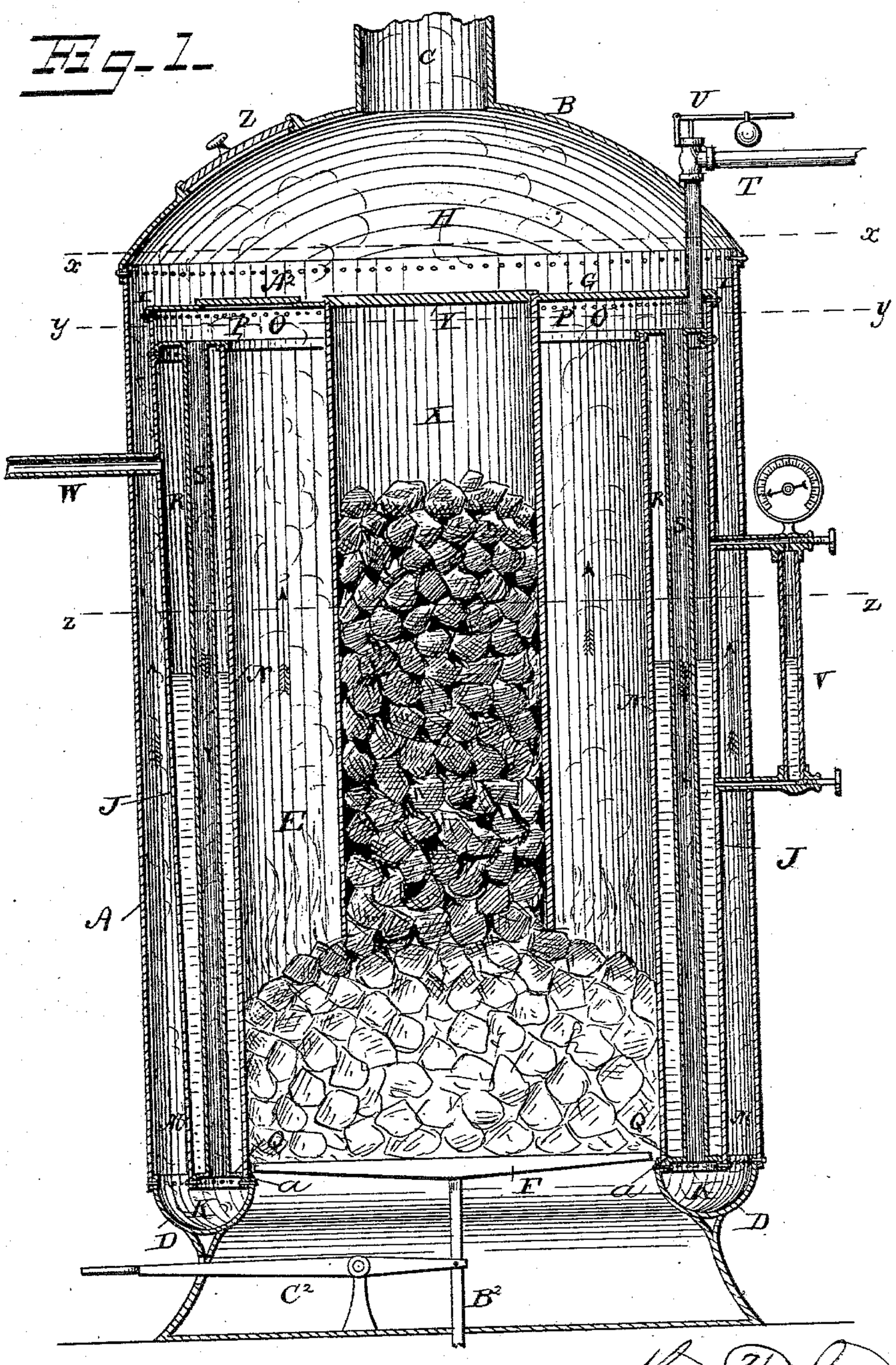
2 Sheets—Sheet 1.

H. H. LINDEMUTH.

STEAM BOILER.

No. 283,497. Patented Aug. 21, 1883.

Fig. 1.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

H. H. LINDEMUTH.

STEAM BOILER.

No. 283,497. Patented Aug. 21, 1883.

Fig. 2.

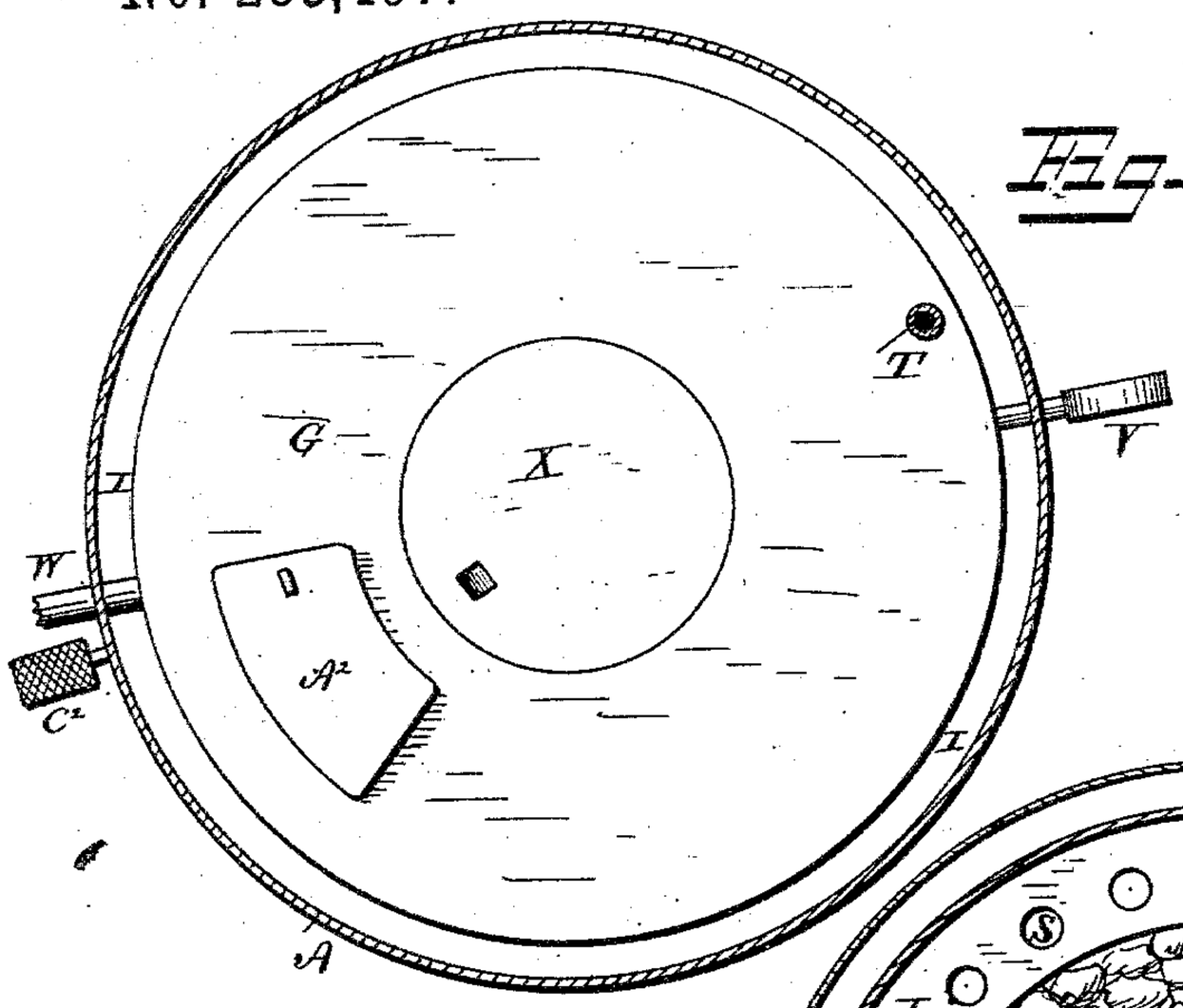


Fig. 3.

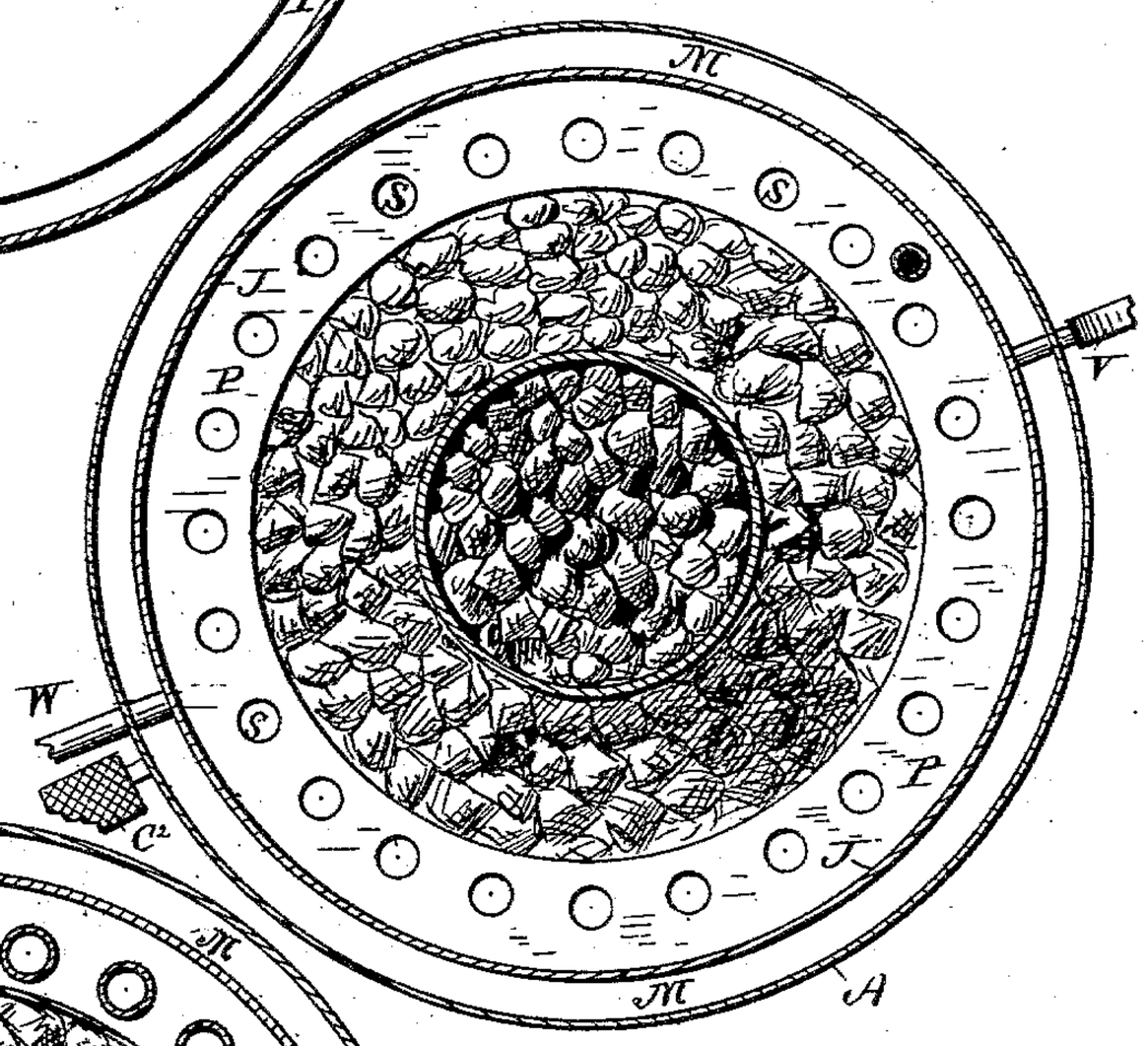
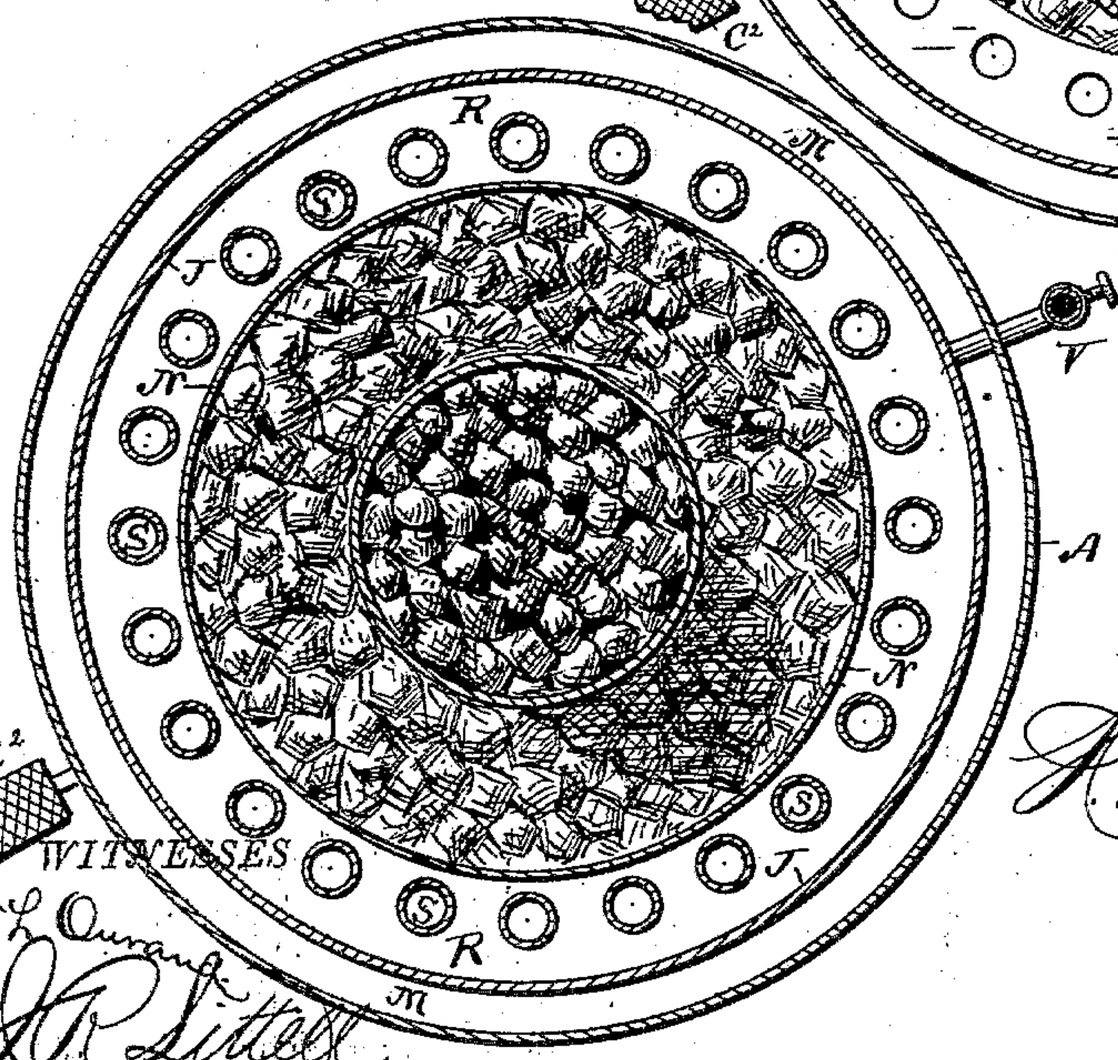


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

HARRY H. LINDEMUTH, OF MOUNT JOY, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 283,497, dated August 21, 1883.

Application filed June 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, HARRY H. LINDEMUTH, a citizen of the United States, residing at Mount Joy, in the county of Lancaster and State of Pennsylvania, have invented a new and useful Steam-Boiler, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to steam-boilers of that class in which flues or tubes are arranged to conduct the heat through the water-chamber; and its object is to provide a boiler of this class which will possess superior advantages in point of simplicity, inexpensiveness, and general efficiency, whereby economy in fuel, heat, and space is secured.

In the drawings, Figure 1 is a vertical longitudinal sectional view of my improved steam-boiler. Fig. 2 is a horizontal sectional view on the line *x x*, Fig. 1. Fig. 3 is a horizontal sectional view on the line *y y*, Fig. 1. Fig. 4 is a horizontal sectional view on the line *z z*, Fig. 1.

Referring to the drawings, A designates the cylindrical outer wall or casing of my improved steam-boiler, which is vertically disposed, and is surmounted by a dome, B, in which is centrally provided the usual smoke-exit opening or flue, C. From the lower edge of the cylindrical outer wall, A, extends an inwardly-projecting bottom, D, as far as the interior fire-chamber, E, the bottom of which latter being formed by the grate F.

G is the horizontal top of the fire-chamber E, this top being arranged just under the dome B—so that a smoke-space, H, is left between it and the dome—and extending nearly, but not quite, to the wall A, so that a smoke-passage, I, remains between the edge of this top G and the said wall A. From the outer edge of the top G depends an approximately-upright cylindrical wall, J, which extends down nearly to the bottom D, so that a smoke-passage, K, is left between the end of this wall and the said bottom, from which the smoke passes into the space or chamber M, between the outer wall, A, and this inner wall, J. This inner wall, J, is preferably inclined downwardly and inwardly, as shown, so that the smoke and products of combustion will be, in a measure, longer retained in the larger portion of the space M, so that its heat will be more completely and economically utilized before it finally escapes through the top passage, I.

N is the inner cylindrical wall, which forms the wall of the fire-chamber E, and projects perpendicularly from the inner edge of the bottom D nearly to the top G, a smoke-passage, O, being thus formed between the top edge of the wall N and the top G. The wall N is connected with the wall J by annular top and bottom plates, P Q, respectively, which project from the ends of the wall N.

It will be observed that the water-chamber (designated by the letter R) is formed by the walls P and J and the top and bottom plates, P and Q, this water-chamber being annular in contour and directly adjoining the fire-chamber E on its inner side, while the hot-air and smoke space M is between it and the outer wall, A, so that it is subjected to heat on both sides and at its top and bottom. Through this chamber R is disposed an annular series of perpendicular flues, S, which pass entirely through the said chamber R, and open at their top into the passage O and at their bottoms into the passage K. The smoke and products of combustion thus have a continuous passage from the fire-chamber E up through the passage O into the flues S, down these flues and through the passage K into the chamber M, from whence they pass up through the passage I into the chamber H and out at the flue C. By this arrangement the water is exposed on all sides to the heat radiation, and the smoke is caused to pass longitudinally and in contact with the wall of the water-chamber three times before it finally escapes—to wit, first up against the inner wall of the water-chamber, then down through the latter by means of the flues S, and then up again against the outer wall of the water-chamber through the space M, as indicated by the arrows, Fig. 1 of the drawings. Steam can therefore be more quickly obtained, and the heat is entirely utilized.

A steam-pipe, T, having a safety-valve, U, may be arranged to project from the top of the steam and water chamber R, through the casing-walls, as shown, to convey the steam to the cylinder of the engine, and a suitable water-gage, V, may be arranged to project from the chamber R through the outer wall, A. The

chamber R can be fed through a suitable pipe, W. The inner wall, N, of the fire-chamber is preferably shrunk into place in lieu of being bolted, when the heat of the fire will always serve to expand it and retain it in desired position. To effect this the plates P and Q are provided with recesses *a* in their inner edges, in which the top and bottom edges of the inner wall, N, are received when the latter is cold, so that the heat of the furnace will expand this unsecured wall and retain it in position in the said recesses. If the wall were bolted in position, the expansion of the metal caused by the heat of the furnace would wrench the bolts. This wall N can be inserted in the sockets or recesses at a temperature lower than it will ever be subjected to, so that it will never contract sufficiently, when the furnace should not be in use, to fall from its sockets. From the top G a feed funnel or reservoir, X, depends centrally in the fire-chamber E, this funnel being provided with a cap or cover, Y, so that there will be no possibility of the escape of the smoke and products of combustion up through the fuel in the funnel without passing through the flues S and chamber M, as above set forth. A door or slide, Z, is provided in the dome B, through which coal can be fed into the funnel, and a door, A^2, is preferably formed in the top G, through which an inspection of the interior can be had.

The grate F is arranged to slide vertically in the chamber, and for this purpose it is provided with a standard, B^2, to which is pivoted a lever, C^2, for operating. By this adjustable grate the amount of fire, and consequently the heating capacity, can be regulated, and for this grate mechanism separate application for patent will be made.

The operation and advantages of my invention will be readily understood and appreciated.

I claim as my invention—

The combination of the cylindrical outer wall or casing, A, the dome surmounting the wall and having the smoke-flue, the annular inwardly-projecting bottom D, extending from the lower edge of the wall A, the horizontal top plate, G, of the fire-chamber, extending nearly to the wall A, and arranged under the dome, the cylindrical wall J, depending from the edge of the top G down nearly to the bottom D, the inner wall, N, extending from the inner edge of the bottom D up nearly to the top G, the annular top and bottom plates, P and Q, extending from the ends of the wall N to the wall J, the annular series of longitudinal flues opening through the plate P at their top into the fire-chamber, and through the plate Q at their bottom into the space between the walls J and A, and the fuel-feed opening in the top G, having a cap or cover, so that the fire-chamber will be closed to force the smoke and products of combustion through the flues, as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

HARRY H. LINDEMUTH.

Witnesses:

PETER BRUNNER,

DAVID H. ENGLE.