

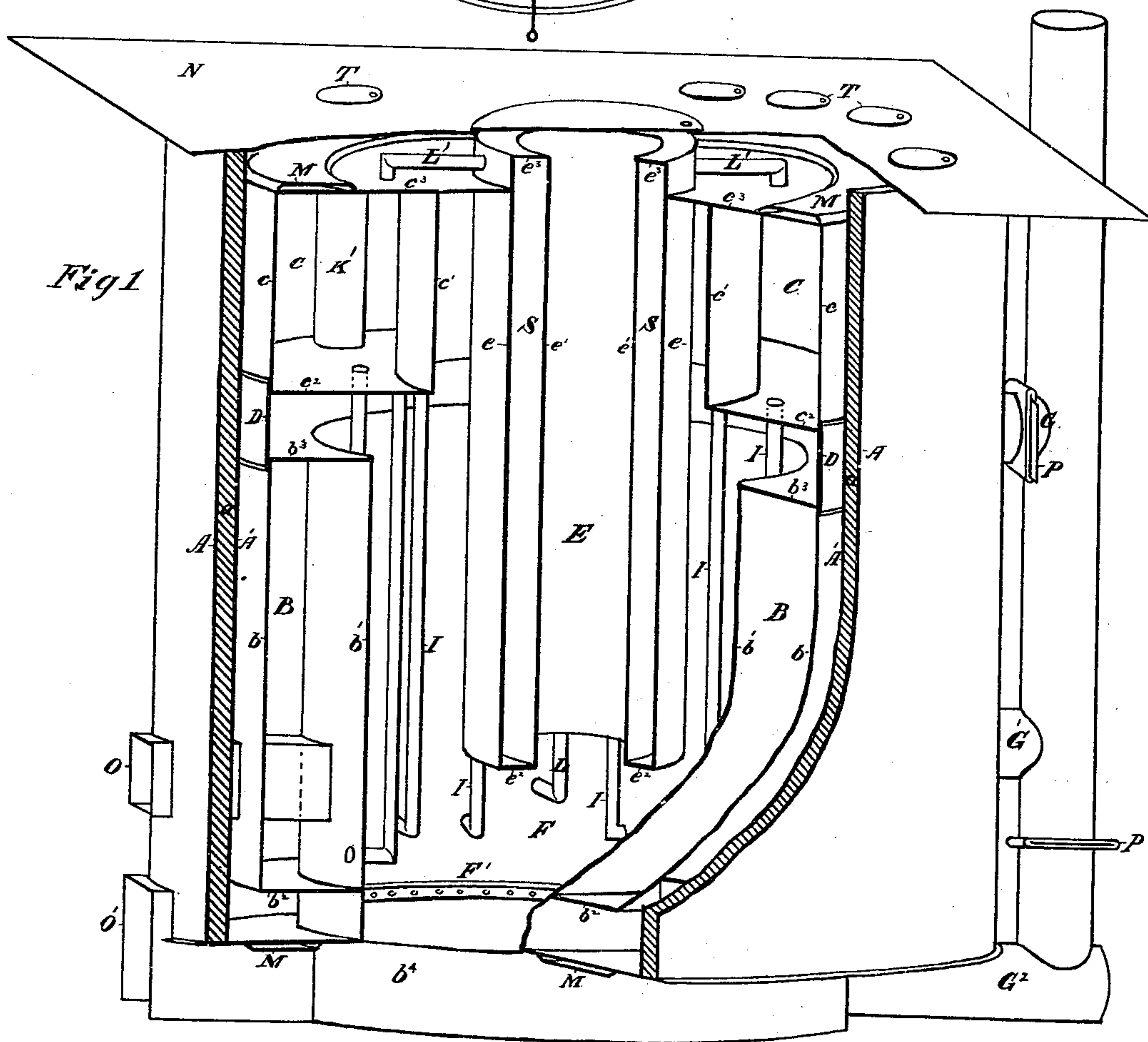
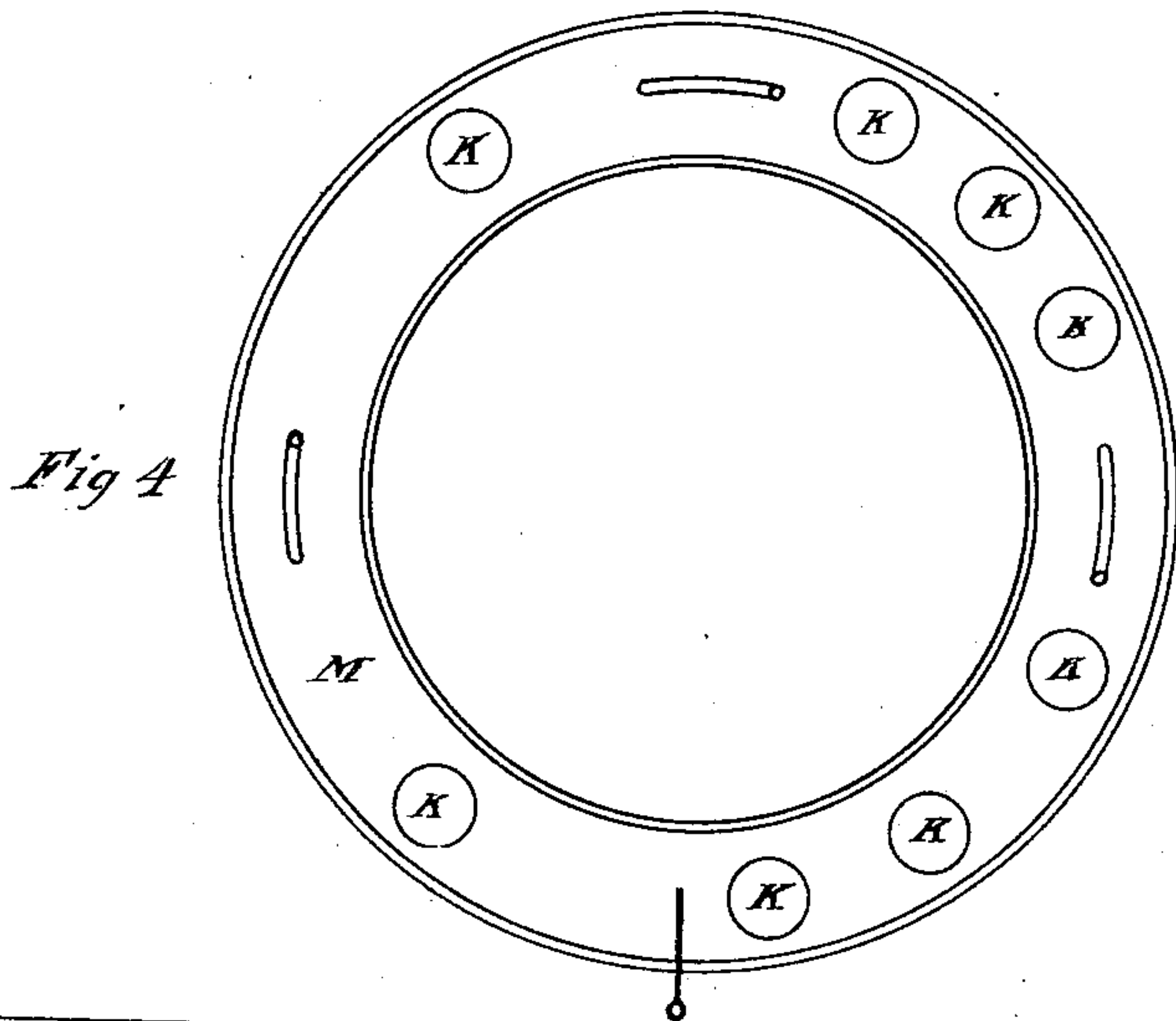
(No Model.)

2 Sheets—Sheet 1.

W. CALDWELL.
STEAM BOILER.

No. 336,036.

Patented Feb. 9, 1886.



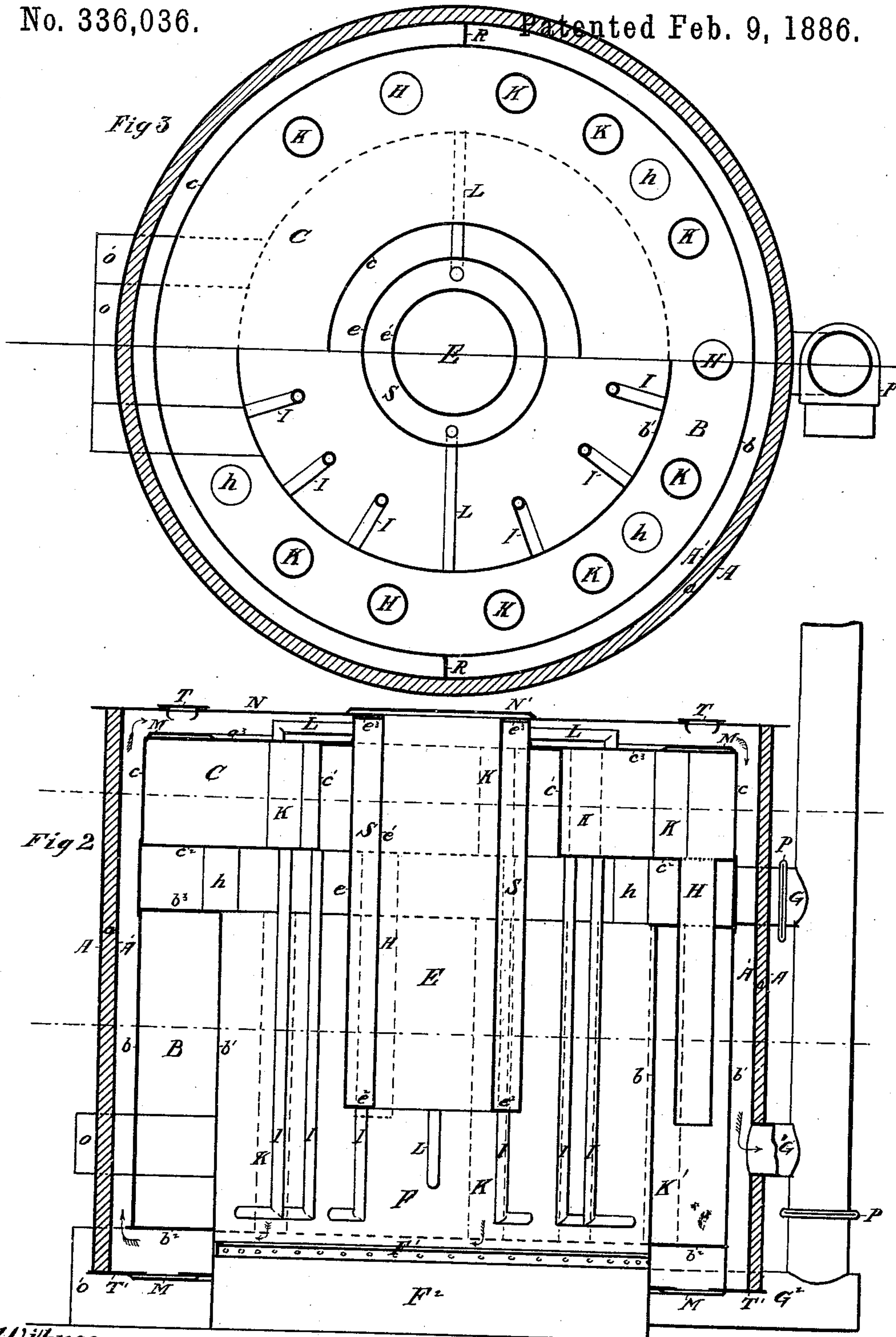
Witnesses:
Silas J. Douglas
Jacob Shill

Inventor
William Caldwell

W. CALDWELL.
STEAM BOILER.

No. 336,036.

Patented Feb. 9, 1886.



Witnesses:
Silas D. Dwyer
Jacob Phil

Inventor
William Caldwell

UNITED STATES PATENT OFFICE.

WILLIAM CALDWELL, OF BUFFALO, NEW YORK, ASSIGNOR OF THREE-EIGHTHS TO JACOB SHILL, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 336,036, dated February 9, 1886.

Application filed July 5, 1884. Serial No. 136,950. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CALDWELL, a citizen of the United States, residing at the city of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Steam-Boiler Furnaces, of which the following is a specification.

My invention relates to steam-boiler furnaces—such as are used in the warming of dwellings and other buildings; and the objects of my invention are to save fuel, to facilitate the circulation of the water and steam, to increase the heating-surface exposed to the heated products of combustion, and to prevent condensation of the steam and dust from the ashes. I attain these objects by means of the device illustrated in the accompanying drawings, in which—

Figure 1 is a perspective of the device with portions broken away, in order to show the interior construction. Figs. 2 and 3 are sectional views more fully illustrating the details of construction.

Similar letters refer to similar parts throughout the several views.

A is a sheet-metal jacket surrounding the whole furnace, and A' is a similar metallic casing a few inches smaller in diameter, and a is sand or the like filled in between to prevent radiation of heat.

B is a water-tank, which is a hollow ring of sheet metal. $b, b', b^2,$ and b^3 are the walls thereof, and K represents flues (or tubes) passing entirely through it from top to bottom, for the passage of the products of combustion. C is a similar hollow ring of the same diameter, but much thicker and shorter, and is a steam-drum, through which pass similar flues, K', provided also for the passage of the products of combustion. $c, c', c^2,$ and c^3 are its top, bottom, and side walls. From the bottom wall of this steam-drum extend short tubes h , which open into the water-tank, making direct communication between the upper portion of the tank and the lower portion of the steam-drum, while other longer tubes, H, extend from the bottom of the steam-drum down into the water-tank nearly to the bottom thereof, and serve to open communication with the bottom of the water-tank. The series of small tubes or pipes, I, ex-

tend from at or near the bottom of the water-tank out into the combustion-chamber of the furnace, and upward into the bottom of the steam-drum, thereby furnishing an easy exit for the steam generated in these pipes.

E is the fuel-magazine. The space S between its walls $e, e', e^2,$ and e^3 is designed for water. Short pipes L at the bottom are the water-inlets, and similar pipes, L', at the top are steam-outlets.

The inner walls of the water-tank may be extended, or an extra skirt be riveted on, so as to rest on the floor and form the skirt b^4 or ash-pit of the furnace, and to this extension or skirt is attached supports for the grate and the rim T', (upon which M, the circular damper, is placed,) in which are holes opposite those in N, so that a brush inserted at T will pass through the flue in the drum and the corresponding one in the tank, and down through the rim to the floor.

The several tubes (marked H, I, and h) support the drum above the tank, leaving a flue-space between them, and the belt D, which passes entirely around both, serves to inclose the space between them, and an extra rim or the extension of c^3 prevents the escape of the products of combustion upward between C and E.

F is the combustion-chamber, and F' a support for the grate, below which is the ash-pit, formed as already described.

G, G', and G² are the escape-flues leading to the chimney or stack.

O is an opening through which the fire may be viewed, and O' is another opening into the grate and ash-pit.

N is the top wall of the furnace, and has a central opening, through which fuel is fed into the magazine, and a series of smaller holes located directly above the flues K and closed with caps or lids. These are for the purpose of enabling the operator to clear the flues, as already described.

R is a partition (see Fig. 3) extending from top to bottom of the furnace, and about midway from front to rear, and located in the flue-space between A' and the tank and drum. This partition, together with an extra rim or extension of b , extending around the back side

of the furnace from R to R, and down to T' at the bottom of the space, prevents the products of combustion from passing out the flue G', but compels them to pass forward of R in the space below b², then upward over the front half of the tank and drum, over the top of the drum, and down on the back thereof to the flue G', as indicated by the arrow-heads in Fig. 2.

10 G is a flue leading from the belt D and space between B and C directly into the stack; hence if a direct draft is desired, as when lighting a fresh fire, the damper P in this flue is opened and the products of combustion pass from F
15 directly out at G.

G² is a flue leading from the ash-pit, and is for use when the grate is being raked or shook, and to prevent the ashes from escaping from O.

Ordinarily the dampers P P will be closed,
20 and the products of combustion will then pass from F upward under C down through B, and those at the rear of R and R, passing to the front of R and R join the rest, and together they pass up over the front and top of B and
25 C, and down on the back of C and B, passing out at G', thus having passed on all sides of both B and C, besides having passed through them by the flues K.

If the ring-damper in M at the top of the
30 steam-drum be opened, the products of combustion will not pass down through B, but will pass up through C and out, as before.

The construction and mode of operation of a ring-damper, although well known, is indicated at Fig. 4. Short pins passing through
35 slots serve to keep it in place, while it is ro-

tated by moving the handle right or left, according as it is desired to open or close the flue-spaces K.

What I claim, therefore, and desire to secure 40 by Letters Patent, is—

1. The combination, with the sand-packed shell A A' a and the boiler B and steam-drum C, having the flues K and K', respectively, and arranged, as shown, relatively to the flue 45 or chamber D, of the partitions R, arranged in the space between the drums and the shell, and the exit-flue having connections G G' G², all constructed and arranged as and for the purposes specified. 50

2. In a boiler-furnace, as described, the boiler B, having flues K, and the steam-drum C, having flues K', arranged, as shown, to form chamber D, in combination with the pipes I, connecting the lower parts of the boiler and drum 55 and projecting into the fire-box, the short pipes h, and the longer pipes H, all arranged and operating as set forth.

3. In a boiler-furnace, as described, the combination, with the boiler B and steam-drum 60 C, and with the fire-box F, of the magazine comprising a cylindrical water-chamber, pipes L, connecting the interior thereof with the lower part of the boiler and projecting into the fire-box, and the pipes L', connecting the 65 said water chamber at the top with the steam-drum C, as set forth.

WILLIAM CALDWELL.

Witnesses:

SILAS J. DOUGLASS,
JACOB SHILL.