2 Sheets—Sheet 1.

B. T. BABBITT.

Steam-Boiler.

No. 202,689. **Patented April 23, 1878.**

Fig 1

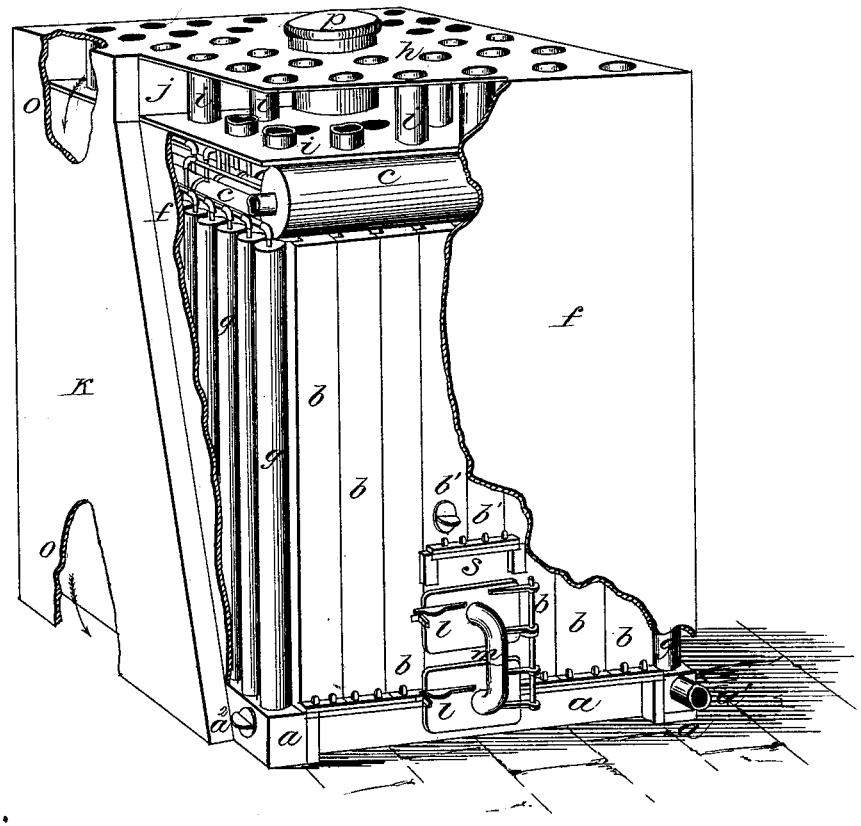


Fig 2

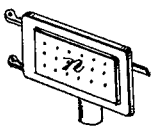
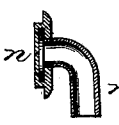


Fig 3



Attest:

J. B. Hyde

Thos. L. Hesse.

Inventor.

B. T. Babbitt

2 Sheets—Sheet 2.

B. T. BABBITT.
Steam-Boiler.

No. 202,689. Patented April 23, 1878.

Fig 4

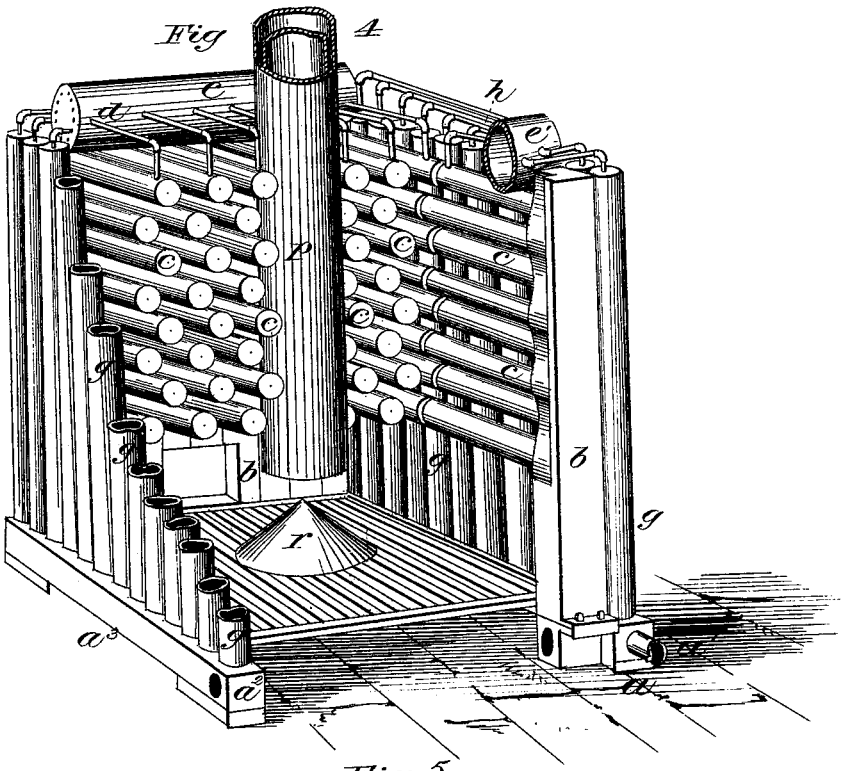
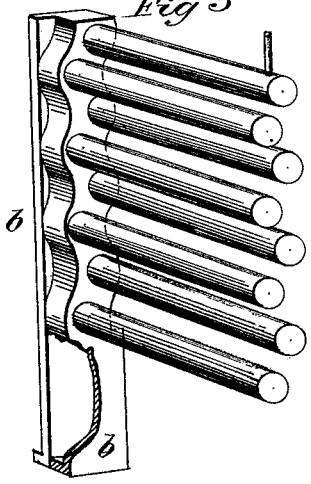


Fig 5



Attest:

J. W. Hyde

Chas. Neuser

Inventor:

B. T. Babbitt

UNITED STATES PATENT OFFICE.

BENJAMIN T. BABBITT, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **202,689**, dated April 23, 1878; application filed December 27, 1877.

To all whom it may concern:

Be it known that I, the undersigned, BENJAMIN T. BABBITT, of the city, county, and State of New York, have invented certain new and useful Improvements in Steam-Boilers, which improvements are fully set forth in the following specification and accompanying drawings.

My improvements relate to a vertical sectional wrought-iron steam-boiler, the detailed portions admitting its being constructed in rectangular shape, consequently in most economic form for the space occupied, as compared with cylinder-boilers. The boiler has therefore a proportionate maximum heating-surface and power. It is readily dissectible for repairs, removal, or transportation. It has a self-feed for fuel, is safe against explosion, and easily managed.

My invention consists in the general construction of the boiler and of certain of its detail parts and their combination; also in the use of heated air in the furnace and mode of supplying it to the fuel and heating gases.

In the drawing, *a* and a^3 represent four horizontal cylinders, united at the ends. They constitute the base of the boiler proper, receive the injected water by the pipe a^1, and distribute it to the evaporating-surfaces or tubes which they support, carry, and sustain, and, situated below the grate-bars of the furnace, they serve as "mud-drums" to pocket up sedimentary matters from the water, a^2 being hand-holes for cleaning.

b b show vertical tubes, flat on one side, and with flanges at the bottom, by which they are strongly bolted to corresponding openings in the top of *a a*, closely fitting at their sides, their flat backs forming the outside of the boilers, the opposite surface being perforated and threaded to receive the open ends of horizontal tube-arms *c c*, the opposite ends of which are strongly closed. These arms have no other support or connection, being left free to expand or contract without strain or influence on any part of the boiler.

The upper ends of the tubes *b b* are also strongly closed. The upper row of arms *c* and bent pipes *d d* convey steam to the drums *e e*, to which their opposite ends are attached. These sectional parts, formed by *b* and *c*, are independent of each other, can be readily removed from the combined boiler, and, for convenience, are named "manifolds," as shown at Fig. 5, and constitute two opposite sides of the boiler, the intervening sides being made up of vertically-placed close-fitting pipes or tubes *g g*, which are secured side by side to corresponding orifices and their supporting cylinder bases *a* and a^3, to complete the vertical surroundings of the boiler. The tops of these pipes *g g* are also closed, and have similar tubes, *h h*, for conveying steam to the drums e' e'.

These described parts constitute the water carrying and steam chambers of the boiler, which is surrounded by a casing or jacket of sheet-iron or other proper material, *f f*, the sides being extended above the cover, as shown, and which, with a second cover, *h*, forms a chamber which is heated by a series of transverse flues or smoke-pipes, *i i*, secured in the top and bottom plates of the chamber, which is divided into two parts by the vertical plate *j*, extending from one side nearly across, leaving an opening at the end. One side of this heating-chamber is cut away, and across the closed end of the partition *j*, one-half being left open to the air, the other half being covered by the upper end of a vertical flue-casing, *k*, extending diagonally across downward to the bottom of the boiler.

The ash-pit has a door directly under the fire-door, as shown at *l*, both doors being connected by a double bent pipe, *m*, secured at either end to a door, and cut across in the middle horizontally between the doors, as seen. The fire-door is double, with an intervening air-space, the inner plate being perforated, as shown at *n*, Figs. 2 and 3.

In operation, the air will be drawn through the open space into the heating-chamber, and pass back and around through the division-opening; thence across to the vertical flue, down which it passes, as shown at *o o*, and under the boiler to the ash-pit, whence a portion, as heated air, will go up through the grate-bars for consumption of the fuel, and the remainder will pass, by the pipe and perforated door, into the furnace above the fuel, to complete the combustion of the gases there.

p shows a central vertical double cylinder,

with a cone, extending from outside the boiler and above the top, where it is sustained, and extending downward into the furnace to some twelve or more inches above the grate-bars, upon which, and directly below the cylinder, is fixed an obtuse cone, *r*. The cone being removed, the fuel is placed within the cylinder to any depth, at will. The coal will slide away off the distributing-cone *r* over the grate-bars, and rest until consumed, when other fuel will gradually fall from the cylinder, as required, and is leveled off by the attendant. The bottom of the annular space of this cylinder *p* is closed, and in use the space is filled with water in any convenient manner.

The manifolds over the fire-door are cut away, as shown at *b'*, where a short mud-drum is inserted and secured to take the flanges of the corresponding tubes that are provided with hand-holes for clearing, a water-way being made between the drum and an adjoining tube.

What I claim in a steam-generator, and desire to secure by Letters Patent, is—

1. The combination of the vertical tubes *g*, communicating at top with the steam-space, and at the bottom with the water-base, and the vertical water-walls *b*, provided with the inward-projecting generating-tubes *c*, constructed and arranged to operate as set forth.

2. The double bent flues *m*, combined with the fire-door and ash-pit, the hot-air flue *k*, and heating-chamber, substantially as described.

B. T. BABBITT.

Witnesses:
J. B. HYDE,
CHAS. G. HEISER.