A. R. Ketcham,

Boiler-Furnace Draft-Regulator.

No. 20,802. Patented July 6, 1858.

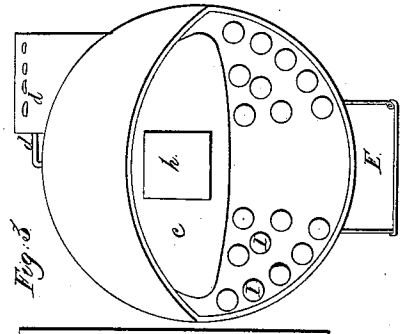


Fig. 3.

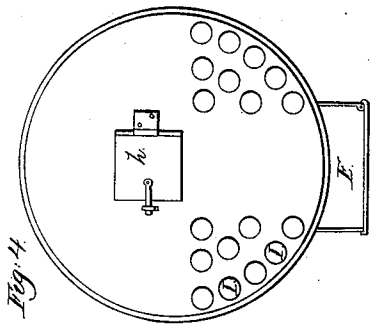


Fig. 4.

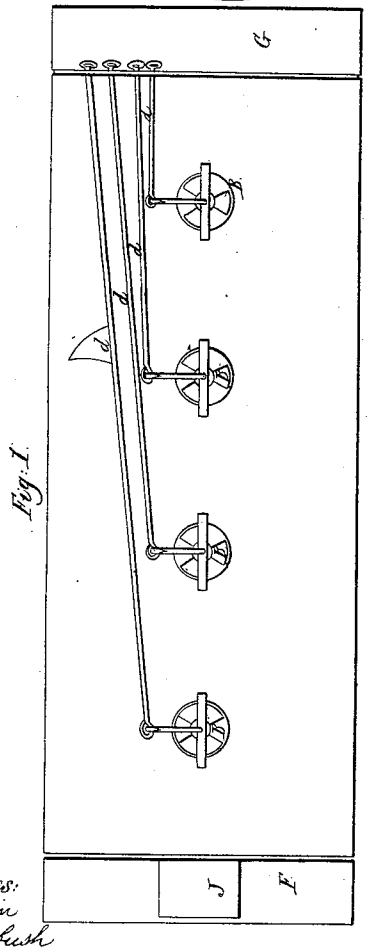


Fig. 1.

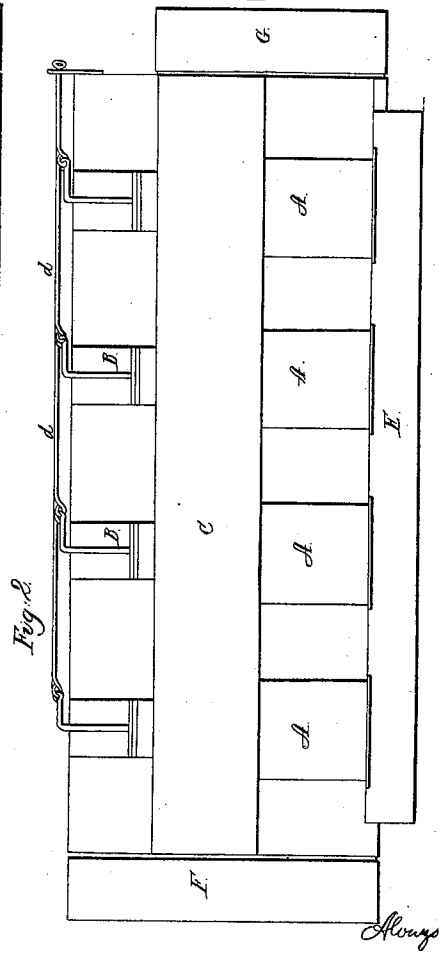


Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

ALONZO R. KETCHAM, OF BUFFALO, NEW YORK.

STEAM-BOILER.

Specification of Letters Patent No. 20,802, dated July 6, 1858.

To all whom it may concern:

Be it known that I, ALONZO R. KETCHAM, of Buffalo, in the county of Erie, in the State of New York, have invented a new and Improved Steam-Boiler; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of my invention relates to the construction of one common fire and combustion chamber centrally within the boiler and the relative arrangement of the several furnaces and registers in reference thereto, into which fire chamber the flames, smoke and gas from the several furnaces are discharged, for the purposes of intensifying and retaining the heat therein and consuming the gas and smoke therein as set forth.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

Figure I, is a plan. Fig. II, is a longitudinal section. Fig. III, is an elevation of the front end, (the smoke jacket being removed). Fig. IV, is an elevation of the rear end, (the smoke jacket being removed.)

Letters of like name and kind refer to like parts in each of the figures.

A, furnaces. These are made in the cylindrical form and are within the boiler, and (as it were) are a part thereof. They should be made of heavy boiler iron and about 14 inches in diameter, and in height extend from the bottom of the boiler to the interior fire chamber, into which the flames are discharged. They are grated at the bottom—with ash box below. Air is admitted at the bottom through the grates. The number of the furnaces in each boiler will be governed by the size of the boiler, the principle being to distribute the fires throughout the entire length of the boiler and surround the furnaces with the water in the boiler. Under some circumstances it may be desirable to set the furnaces in brick work or otherwise, outside the boiler, in which case I contemplate so doing without changing the main feature of my interior fire chamber.

B, registers. These will hold a sufficient quantity of coal to supply the furnaces for, say from 30 to 50 miles. By means of the rods, *d*, each furnace can be fed separately from the other, by the fireman without leaving his place.

c, fire chamber. This is located centrally within the boiler and the water surrounds it. The flames from each fire, pass into this chamber and there combine and make an intense heat, where all the gas and smoke from the furnaces will be consumed. Pipes, connecting the external air with this chamber, will be introduced into the arrangement so as to increase and intensify the heat. These pipes may pass through the furnaces, or through the boiler chamber, so that the air will be well heated before it enters the fire chamber. This chamber is not intended for, and does not act as a mere flue nor as several flues, to give draft and conduct off the heat, smoke, gas, &c. It is made of a much larger capacity than is expedient for such purposes merely. It is intended for, and serves the purpose of one common reservoir, and combustion chamber, where the flames and heat, from the several furnaces accumulate and become augmented by the consumption therein of the smoke and gas, and the heat also becomes concentrated and intensified by its delay or dwelling therein.

d, rods, connecting with the registers, and by which the fireman can feed the furnaces without leaving his place in the caboose. E, ash-box. F, rear, smoke jacket. G, front, smoke jacket.

h, door and opening in the rear end of the fire chamber. This door may be opened when kindling or starting the fires, so as to open a direct draft, with the chimney. This door and opening will also be of service in cleaning the fire chamber and in making repairs.

I, flues, which return the flame from the front to the rear smoke jacket. J, chimney.

I deem this description in connection with the drawings to be sufficiently explicit to enable a mechanic skilled in the art to make and use my invention.

The advantages gained by my invention are 1st, the application and use of cylindrical furnaces by which the combustion of the coal will be more perfect, and the greatest possible amount of heat obtained therefrom. 2d, a great advantage is gained by the distribution of the fires throughout the entire length of the boiler (or circumference, if an upright boiler is used, the principle of my improvement being applicable to an upright boiler) whereby heating surfaces are largely increased, and the water brought in direct contact therewith. 3d, in the introduction and use of a common fire chamber

in the interior of the boiler, where the gases and smoke which escape from the several furnaces will be consumed, and whereby a much larger amount of fire surface is obtained than in any other boiler. The air register connected with this chamber adds greatly to increase the combustion and intensify the heat. 4th, the draft from the fire chamber is downward and traverses the flues, consequently the heat will be longer retained and more completely absorbed than in the usual form of locomotive boilers, where it passes off longitudinally from the fire box. 5th, in consequence of the arrangement of the cylindrical furnaces, and the great extent of fire surface the combustion of the coal will be much slower, the law being, "the slower the fire the more perfect the combustion." 6th, by my improvement I economize in the cost of construction and in the space occupied, and in the amount of fuel consumed.

Some parts of the description herein appear to apply to locomotive boilers only, but the principles of my improvements are equally applicable to stationary or steam boat boilers, whether placed in an upright or horizontal position.

I claim—

The construction, and arrangement of the interior fire chamber, *c*, relatively to the furnaces A, A, (&c.) and the registers B, B, (&c.) for the purposes, substantially as herein set forth.

ALONZO R. KETCHAM.

Witnesses:

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F. L. BALDWIN.