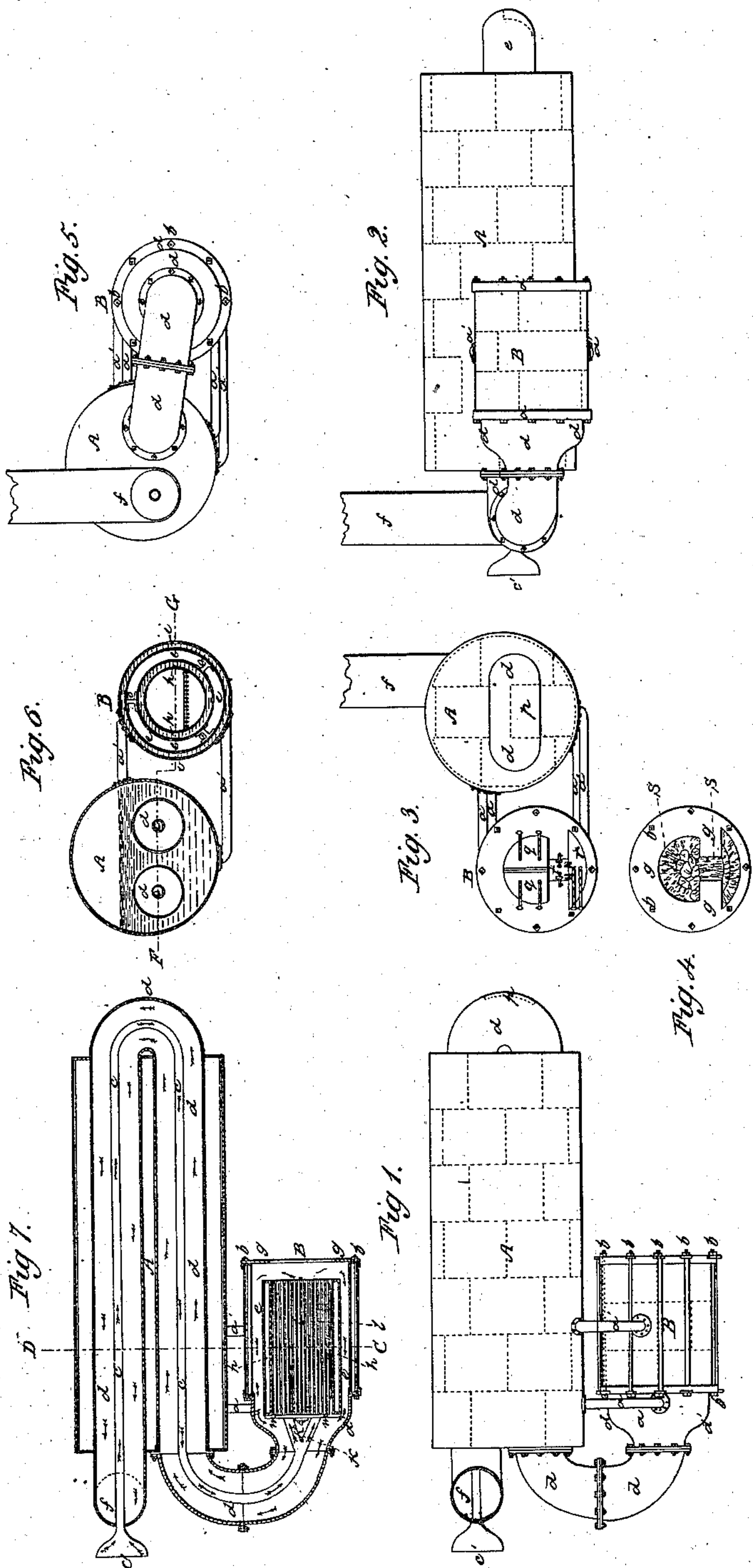


The specification of this application
 for a new and improved

Z. C. Robbins,
Feeding Boiler Furnaces,
No. 3,200, *Patented July 28, 1843.*



UNITED STATES PATENT OFFICE.

ZENAS C. ROBBINS, OF ST. LOUIS, MISSOURI.

MANNER OF CONSTRUCTING STEAM-BOILERS.

Specification of Letters Patent No. 3,200, dated July 28, 1843.

To all whom it may concern:

Be it known that I, ZENAS C. ROBBINS, of St. Louis, in the State of Missouri, have invented a new and useful Mode of Constructing Boilers for the Generating of Steam; and I do hereby declare that the following is a full and exact description thereof.

My boiler consists of two principal parts, one of which I denominate the double, concentric boiler, and the other the larger boiler, or feeder. These are to be so connected together as to constitute one combined boiler, or steam generator. Both of these boilers are cylindrical, and are, usually, both placed horizontally, and parallel to each other. The double concentric boiler may be one half, or one third, more or less, of the length of the large boiler, or feeder; in it is contained the furnace, the heat from which is to generate steam in the concentric boilers by which the furnace is surrounded, and likewise in the large boiler, or feeder, for which latter purpose a flue leading from the double concentric boiler is carried twice through the large boiler, whence it escapes through a chimney in the ordinary way.

In the accompanying drawing Figure 1, is a plan, or top view, of my combined boilers, A, being the large boiler, or feeder, and B, the double concentric boiler. In the respective figures, these are designated by the same letters of reference; and the same is the case with the other parts, wherever they are repeated. Fig. 2, is a side view, or elevation, of the two boilers. Fig. 3, is an elevation of the boilers, with some of their appendages. Fig. 4, is an end elevation of the double concentric boiler; the furnace and ash-pit doors being removed. Fig. 5, is an elevation of the rear end of my combined boilers, showing the flue d, d , through which the heated air passes, the chimney f , in which said flue terminates, and the pipes a, a' , by which the water chambers of the respective boilers are connected. Fig. 6, is a vertical, cross section through the combined boilers, in the line C, D, of Figs. 1, and 7. Fig. 7, is a horizontal section through the centers of the combined boilers, in the line F, G, of Fig. 6.

In Figs. 6, and 7, i, i , shows the outer, and h, h , the inner, water space of the double concentric boiler, and e, e , the flue space between them; l , is the grate bars for sustaining the fuel; o, o , are brackets preserving the concentric boilers in their relative posi-

tions; n , is the ash-pit, or space, under the grate. The innermost of the concentric boilers extends farther back than the exterior, as shown at h, h , Fig. 7; and the outermost of these boilers extends to the front plate, or head, g, g , leaving a space between the front end of the inner boiler and the furnace head g , for the passage of the smoke and heated air in their way from the chambers of combustion into the flue space, e, e , between the two boilers, whence it passes into the flue d, d , which is bell-shaped at d', d' , but assumes the cylindrical form as shown at d, d , and is recurved, as represented in the drawings, so as to pass back and forth through the large boiler A, and to the exit pipe, or chimney f . The direction of the draft from the furnace, and through the flue spaces is indicated by the arrows. b, b, b , are screw heads, or the ends of iron rods, which pass through the head g, g , and the edge of the bell-formed part of the flue pipe d', d' , serving to confine them to the ends of the outer double boiler; the ends of this boiler are not formed by these heads, but are independent of them. The rear end of the furnace is closed by the plate m, m , there not being any draft through it in this direction. The concentric double boilers communicate with the large boiler, or feeder, A, by means of the pipes a, a' , the pipes a, a , passing from the inner, and the pipes a', a' , from the outer, concentric boiler into the large boiler.

In Fig. 3, q, q , are the furnace doors, and r, r , the ash-pit doors, to admit a scraper to clear the ashes from under the grate bars, and from between the boilers; p , is a door opening into the flues d, d , for cleaning them out.

For the purpose of rendering the combustion of the fuel in the furnace the more efficient, I have devised a mode of heating the air which is to be admitted into the rear end of the ash-pit. A tube, c, c , a bell-shaped opening into which is shown at c' , is made to pass through the flue d, d , and to enter the rear end of the ash-pit; in doing which, the air will necessarily acquire a temperature equal to that of the heated portion contained in the flues.

It will be manifest that the above described apparatus may be varied in form, and in the particular arrangement of some of its parts, while the nature of the invention will remain unchanged.

In sheet No. 2, Figs. 6, and 7, I have rep-

resented my apparatus under modifications which will in some cases be preferred to that above described. The only material change under this arrangement, consists in the placing of the large boiler, or feeder, A, vertically; the double concentric boilers remaining precisely as described above. The same letters of reference which are used in the first sheet of drawings will, therefore, fully designate the nature and use of the respective parts.

In Figs. 1, 2, 3, 4 and 5, of drawing No. 2, I have represented another manner of constructing my steam-boiler. Fig. 1, is a front elevation of the boiler under this modification, and Fig. 2, a side elevation thereof. Fig. 3, is a vertical section from front to back, through the middle of the apparatus, or in the line A, B, of Fig. 1. Fig. 4, is a vertical, cross section in the line C, D, of Fig. 3. Fig. 5, is a horizontal section through it, in the line E, F, of Fig. 4. Under this modification the outer concentric boiler is omitted, as is also that denominated the large boiler, or feeder, their place being supplied by a large, cylindrical boiler I. The furnace is the same as in my first described arrangement, and is situated within the inner annular boiler, *h, h*; in this furnace and boiler, and their appendages, the parts that are similar to those in the modifications before described are designated by the same letters of reference. I propose under this modification to feed my furnace at the rear end, where it is closed by the partition *m, m*. J, is a feeder furnished with a valve at K, which may be opened, and the fuel forced into the feeding tube L, by means of a slider, M, extending at its inner end to the height of the valve K. The flues *d, d*, and the air tubes *c, c*, are, so far as this arrangement admits, similar to those formerly described.

I intend, sometimes, to employ an improved apparatus for the heating, by means of the waste steam, the water by which the boiler is to be supplied, and also the air for sustaining combustion. Fig. 8, is a vertical section along this apparatus. N, and O, are two cylinders placed one above the other, and having heads at P, P; these heads are inclosed by conical caps Q, Q; from one of the heads to the other extends any desired number of tubes, R, R, opening into the spaces formed by the conical caps. Through the openings S, S, in the conical caps, water is to be introduced so as to pass through the

tubes in the lower cylinder; and air, so as to pass through those in the upper cylinder. The waste steam is to be introduced into the lower cylinder through a suitable opening, as at T, and to pass thence through a tube U, into the upper cylinder, in the first of which it will heat the water contained in the tubes, and in the second, the air. V, is a pipe through which any waste water from the condensation of steam may be allowed to escape. The tube W, is intended for the purpose of admitting a portion of steam from the lower cylinder to commingle with the heated air as it passes toward the furnace. X, is a tube, furnished with a valve, for the final escape of steam from the upper cylinder.

Having thus fully described the manner in which I construct my steam boiler, or generator, and explained the action of the respective parts thereof, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The manner in which I construct the furnace, and combine it with the annular, cylindrical boiler, *h, h*, which immediately surrounds it; the peculiarity in said furnace consisting in its being closed at the rear end, the air for supporting combustion being also admitted at that end, and the gaseous products of combustion passing toward the front, and then toward the rear on the outer side of the boiler, *h, h*; an arrangement existing in each of the modifications of my boiler.

2. I also claim the manner of constructing the double concentric boiler, in combination with a furnace closed at its rear end, and otherwise formed as above set forth.

3. I claim the manner of combining the double concentric, and the large boiler, or feeder, by means of the flue *d, d*, constructed, and arranged as described under my first and second modifications thereof, the large boiler in the former case being horizontal, and in the latter, vertical.

4. I claim the manner of combining my furnace with the annular boiler, *h, h*, and with the large cylinder, A, A, as described and represented under my third modification; the large cylindrical boiler being, in this case, substituted for what I have called the large boiler, or feeder.

ZENAS C. ROBBINS.

Witnesses:

THOS. P. JONES,

EDWIN L. BRUNDAGE.