S. Baldwin,

Steam-Boiler Water-Tube.

No. 16,959. Patented Apr. 7, 1857.

Fig. 2

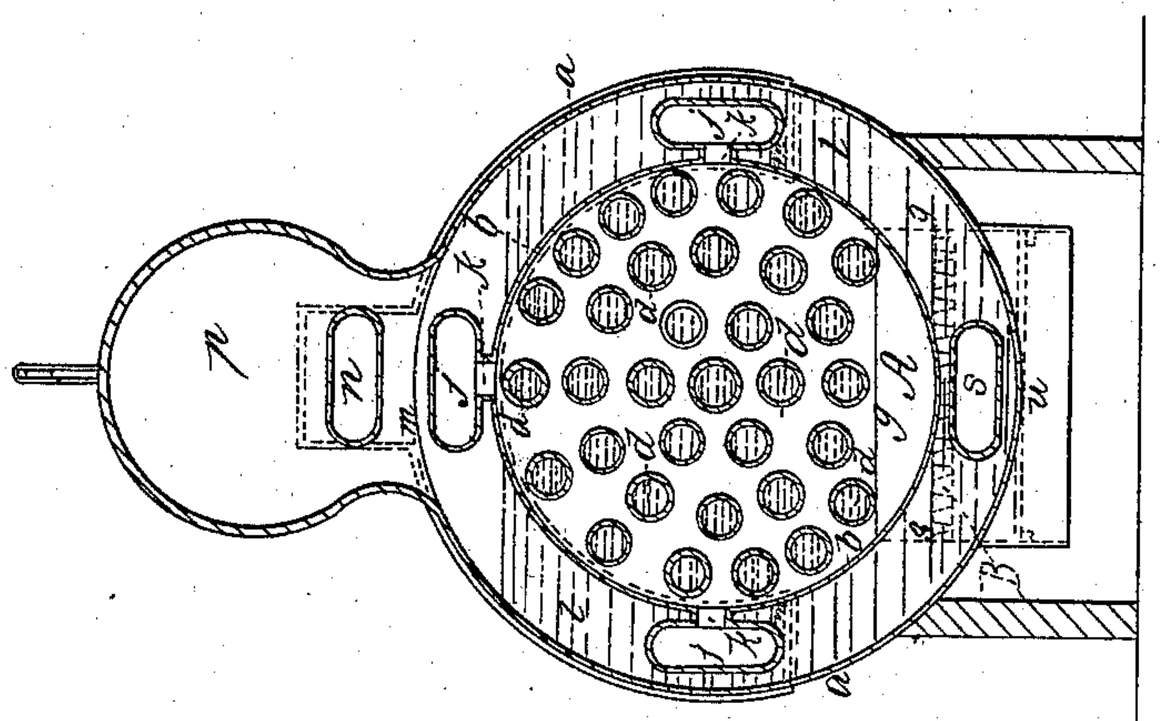
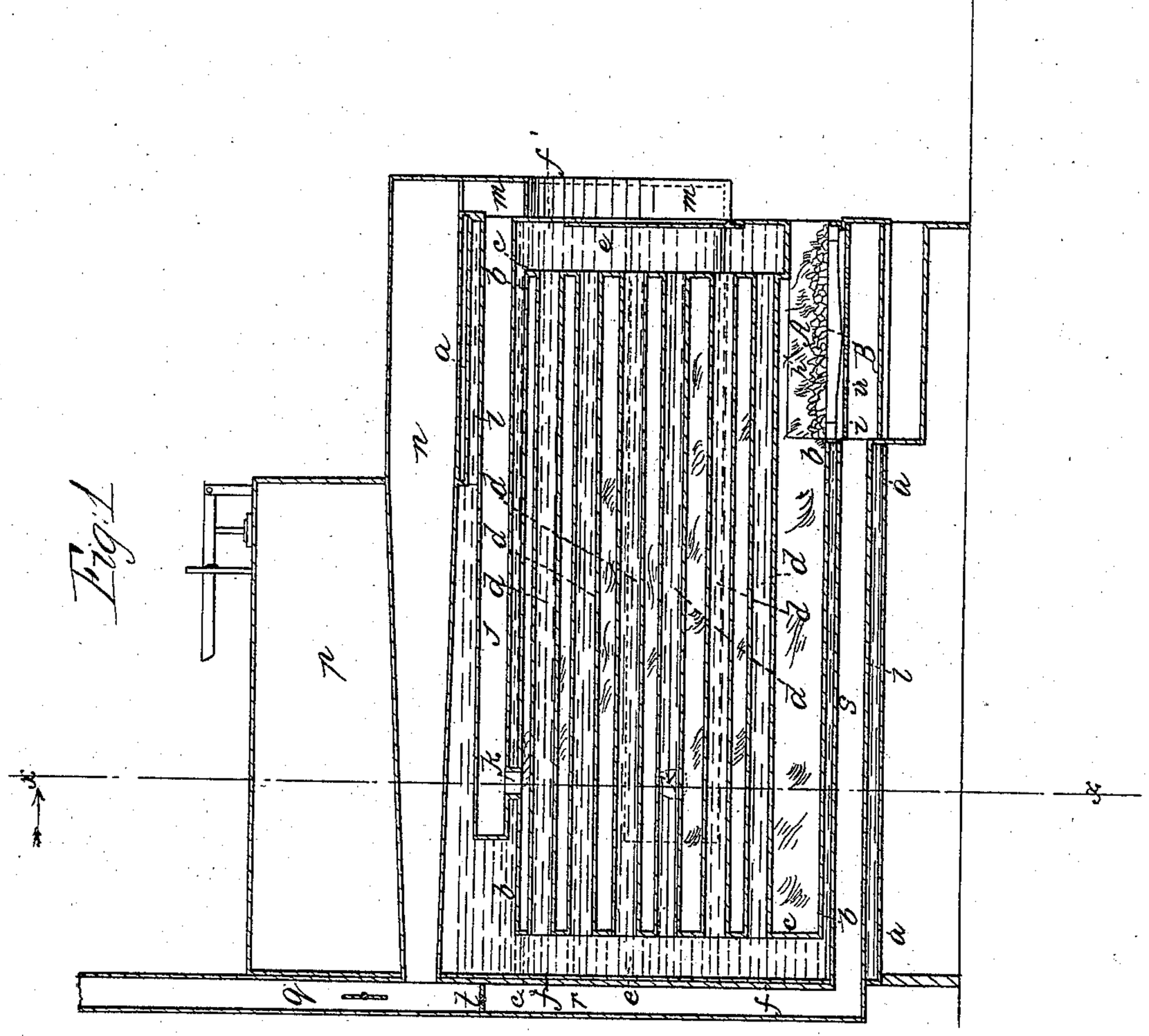


Fig. 1



UNITED STATES PATENT OFFICE.

SMITH BALDWIN, OF ST. LOUIS, MISSOURI.

STEAM-BOILER.

Specification of Letters Patent No. 16,959, dated April 7, 1857.

To all whom it may concern:

Be it known that I, SMITH BALDWIN, of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central longitudinal vertical section of a boiler constructed according to my invention. Fig. 2, is a transverse vertical section of the same, in the line *x*, *x*, of Fig. 1, looking in the direction of the arrow 3, or toward the front of the boiler.

Similar letters of reference indicate corresponding parts in both figures.

This invention consists in a novel arrangement of water-spaces, water tubes, fire surface and flues, whereby a very extensive heating surface is obtained covered with a small body of water and at the same time a perfect circulation of water is provided for, making a boiler that is at the same time safe, durable and economical.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

a, is a horizontal cylinder constituting the external shell of the boiler.

b, is an inner cylinder of smaller diameter and shorter than *a*, arranged concentrically with it so as to provide for a circulation all around the inner cylinder and between the heads *c*, *c*, of the inner and the heads *f*, *f*[1], of the outer cylinder. The heads *c*, *c*, of the inner cylinder *b*, are tube sheets to receive a number of horizontal water tubes *d*, *d*, which form a means of communication from one to the other of the two water spaces *e*, *e*, between the heads of the two cylinders, and for the circulation of the water.

A, is the fire place, and B, is the grate, the latter being at about the level of the bottom of the inner cylinder *b*, which, as well as the outer cylinder, has a piece cut out of its bottom, in the form of the line *g*, *g*, *g*, shown in Fig. 2, to form the fire place and make a communication therefrom to the interior of the cylinder *b*. The lower front parts of the cylinders where they are cut away to make the fire place is closed by plates in the line *h*, *i*, Fig. 1.

j, *j*, are flues of which there may be any number, connected by elbows *k*, *k*, with the sides and top of the cylinder *b*, near the rear end thereof and running forward horizontally through the annular water space *l*, between the cylinders *a*, *b*, and passing through the front head *f*[1], of the outer cylinder *a*, into a hollow arched flue *m*, in front of the boiler.

n, is a horizontal flue running from the top of the arched flue *m*, over the top of the cylinder *a*, through the steam chamber *p*, which is above the said cylinder, to an upright chimney *q*, at the rear of the boiler. The proper water level is about even with the top of the outer cylinder *a*.

The operation of the boiler is as follows: The fire on the grate B, acts by radiation on a large portion of the exterior of the tubes *d*, *d*, and the gaseous products of combustion circulate among and around the said tubes and around the interior of the cylinder *b*, which, with the exterior of the tubes, is all heating surface and from thence escape through the elbows *k*, *k*, and flues *j*, *j*, which are all heating surfaces, into the arched flue *m*, and from thence though the flue *n*, (which, passing through the steam chamber, dries the steam) to the chimney *q*.

The chimney *q*, is continued downward as shown in Fig. 1, to form a flue *r*, communicating with a horizontal flue *s*, passing through the bottom of the water space *l*, to the ash-pit, for the purpose, if desired, of returning the gaseous products of combustion, or a portion thereof, by way of the ash pit *u*, through the fire, to be consumed but this arrangement of flues can be shut off by a damper *t*, when it is not desired to use it.

What I claim as my invention, and desire to secure by Letters Patent, is:

The arrangement of the cylinders *a*, *b*, the water tubes *d*, *d*, flues *j*, *j*, *m*, and *n*, in the manner substantially as herein described, to operate as herein set forth.

SMITH BALDWIN.

Witnesses:
W. TUSCH,
WM. HAUFF.