

No. 814,949.

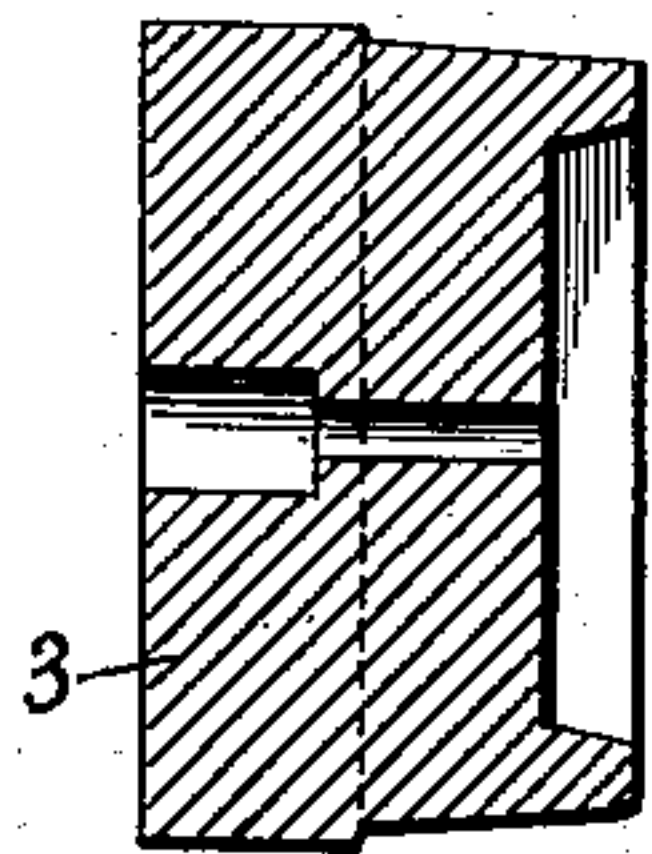
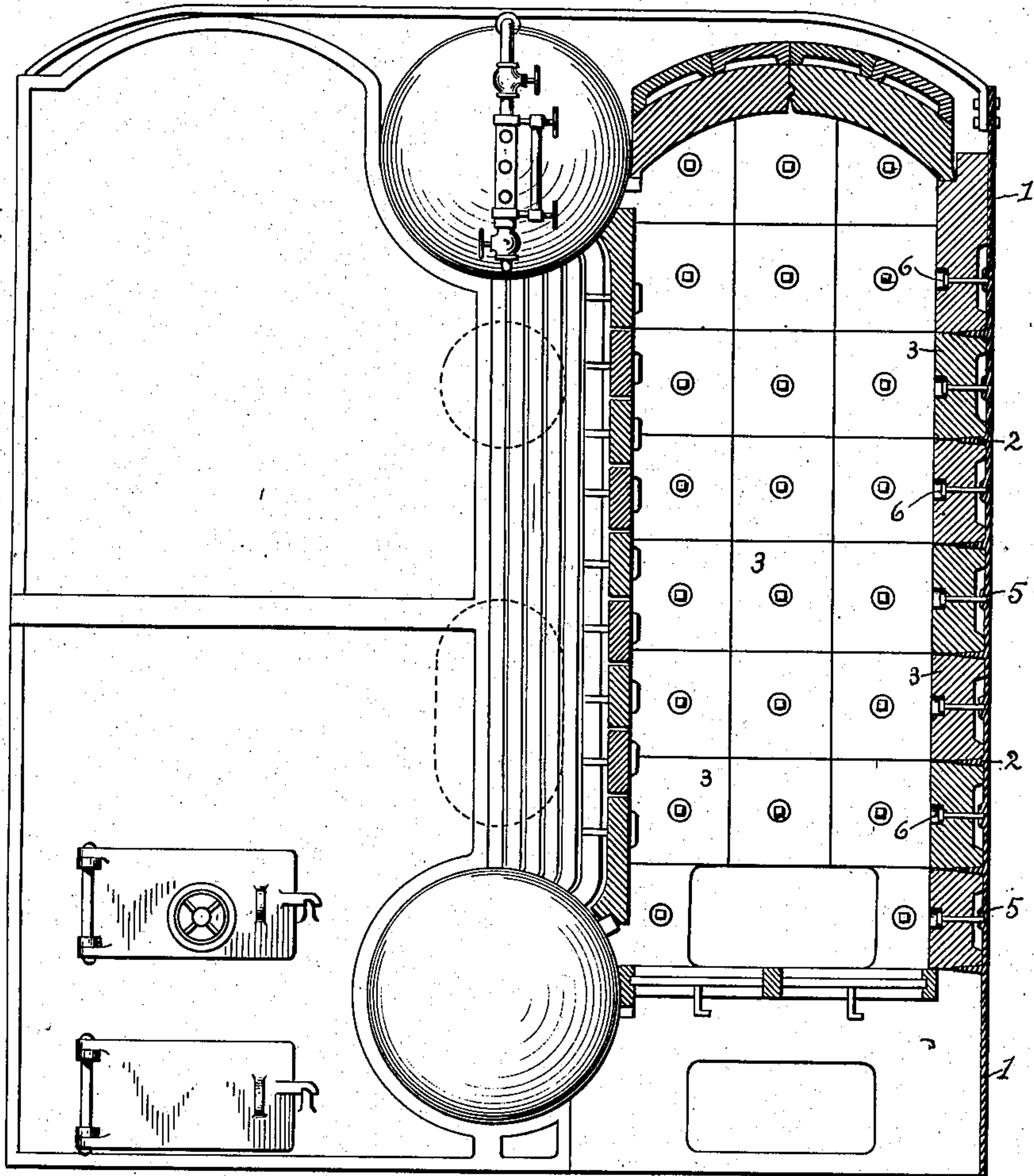
PATENTED MAR. 13, 1906.

E. F. EDGAR.  
BOILER FURNACE.

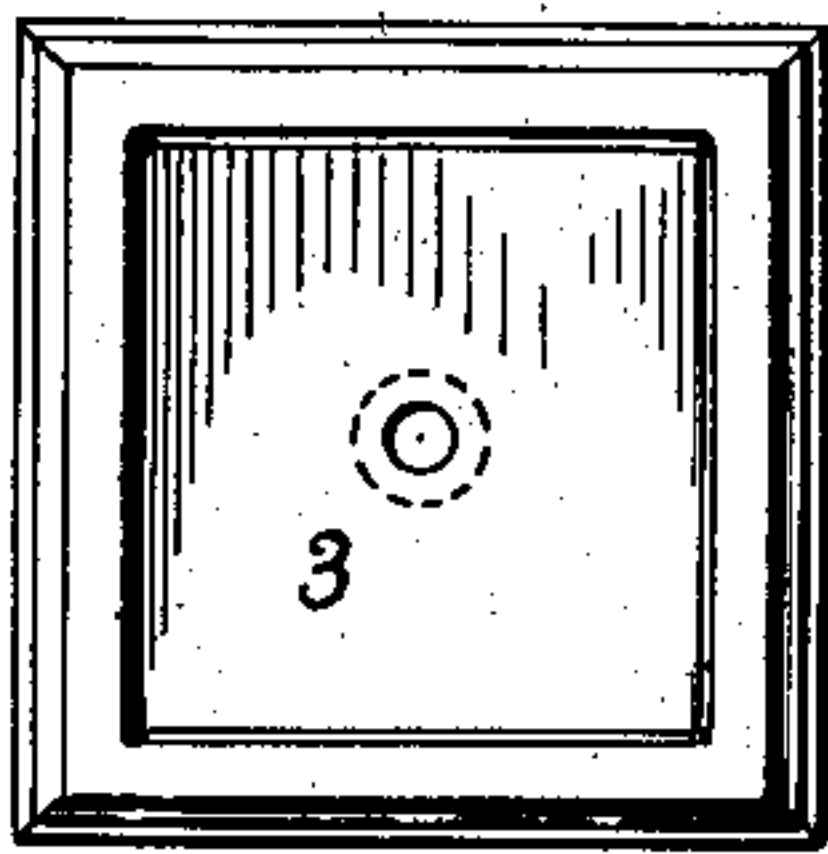
APPLICATION FILED OCT. 27, 1903.

2 SHEETS—SHEET 1.

*Fig. 1.*

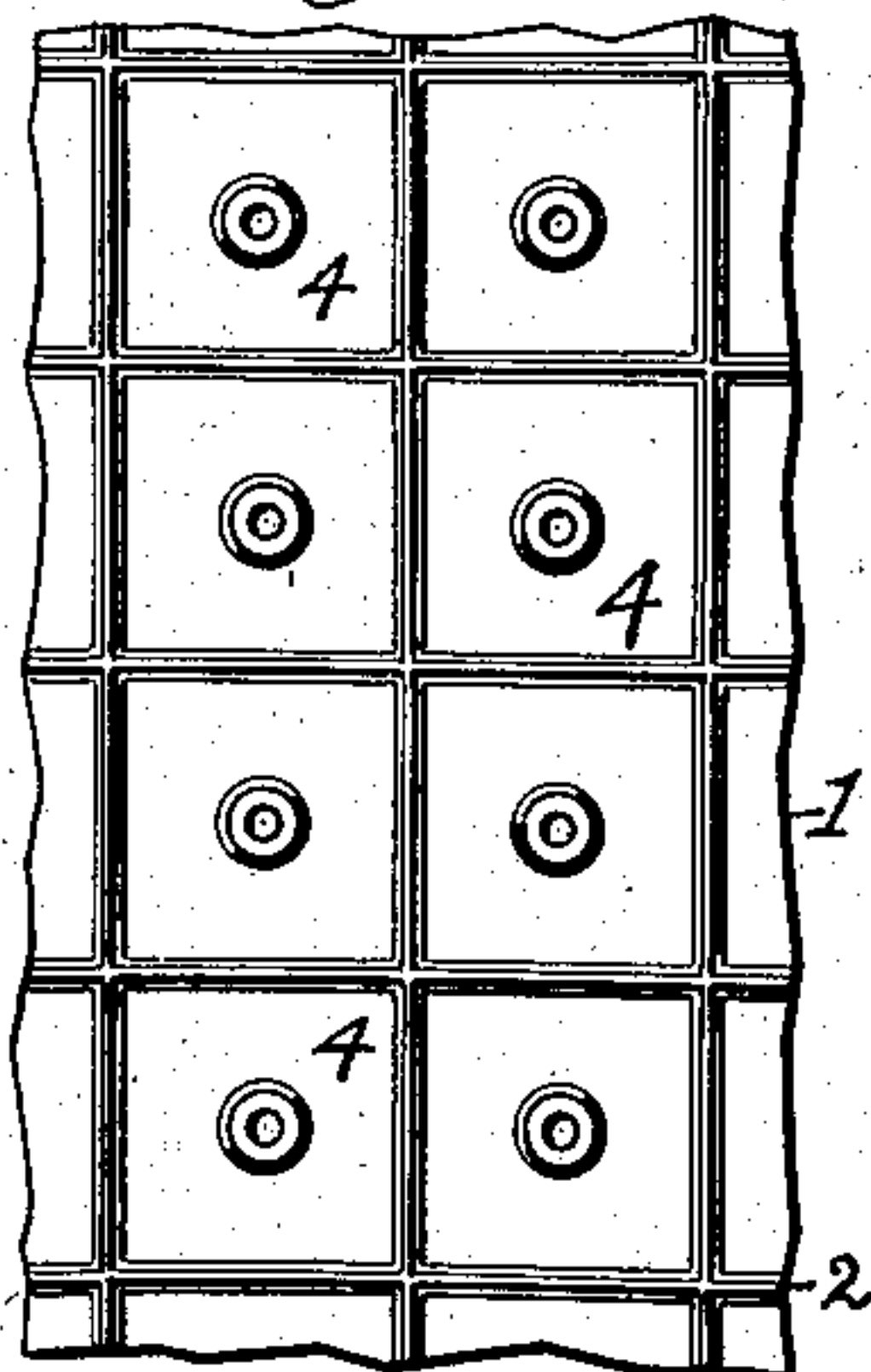


*Fig. 3.*

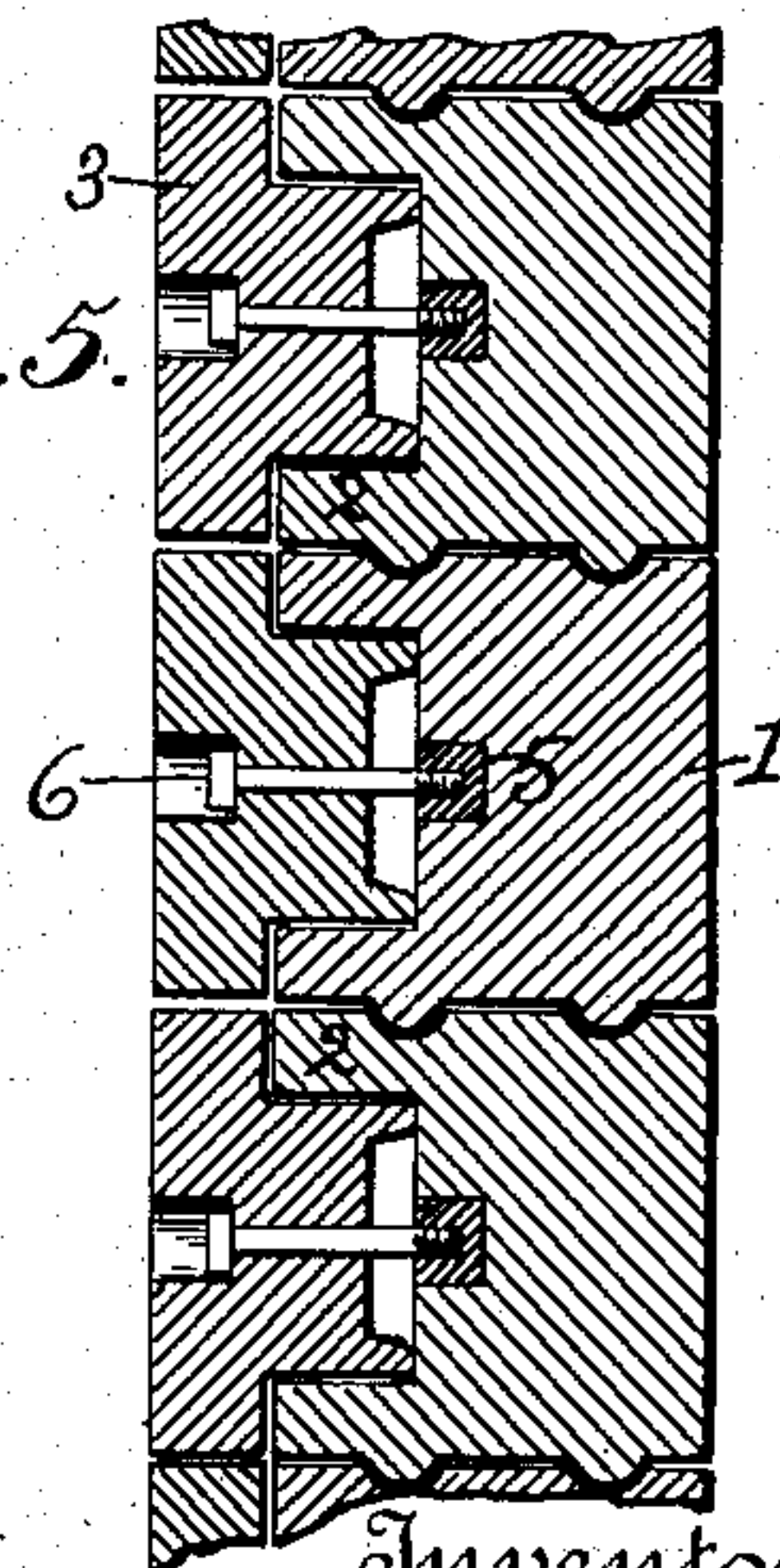


*Fig. 4.*

*Fig. 2.*



*Fig. 5.*



Witnesses  
Edward Rowland,  
Ellis B. Edgar.

Inventor  
Ellis F. Edgar



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2 SHEETS—SHEET 2.

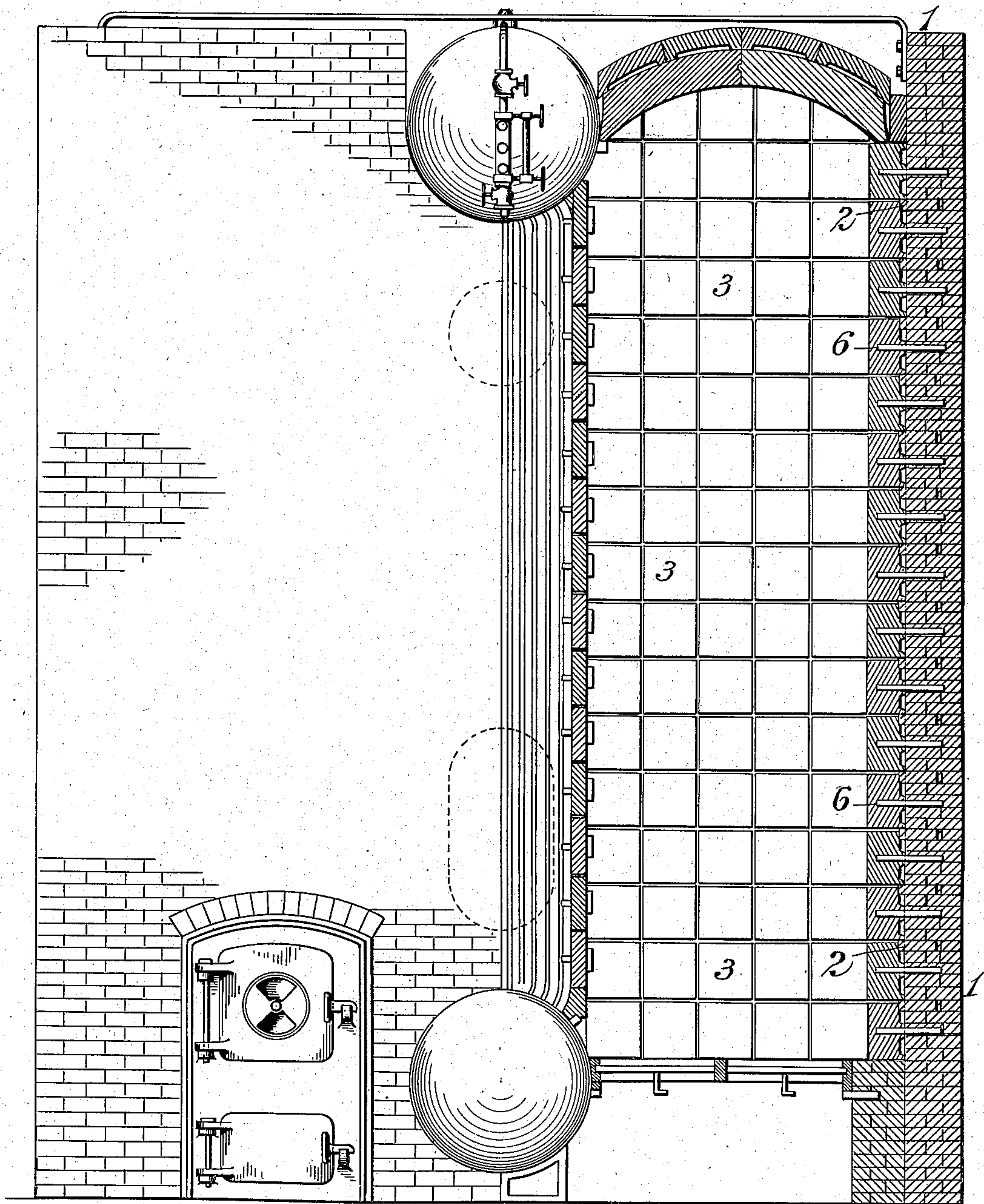


Fig. 6.

Witnesses  
Edward C. Dowland.  
W. A. Franz.

Inventor  
E. F. Edgar.



# UNITED STATES PATENT OFFICE.

ELLIS F. EDGAR, OF WOODBRIDGE, NEW JERSEY.

## BOILER-FURNACE.

No. 814,949.

Specification of Letters Patent.

Patented March 13, 1906.

Application filed October 27, 1903. Serial No. 178,672.

*To all whom it may concern:*

Be it known that I, ELLIS F. EDGAR, a citizen of the United States, and a resident of Woodbridge, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Boiler-Furnaces, of which the following is a specification.

Figure 1 is a front elevation of a boiler, part in full and part in section, embodying my invention. Fig. 2 is a detail of eight pockets with fire-brick lining removed. Fig. 3 is a section view of one of the fire-bricks. Fig. 4 is a back view of one of the fire-bricks, showing dead-air space in same. Fig. 5 is a section view of a red-brick casing, showing fire-clay lining attached to the same; Fig. 6, a front elevation of a boiler, part in full and part in section, embodying my invention.

I had in view the following objects in designing this style of boiler-furnace, namely: an outside casing constructed air-tight, having pockets on the furnace side of the same for the reception of a fire-brick lining composed of a special brick or block made and arranged in such a manner that the expansion and contraction of the same is provided for in every twelve inches each way, thereby preventing the bulging and cracking of the outside casing, causing leaks for the admission of air.

1 is the outside casing; 2, projection from casing forming pocket; 3, fire-brick lining; 4, pocket shown in Fig. 2 with fire-brick removed; 5, threaded boss for securing anchor-bolt; 6, anchor-bolt.

The outside casing 1 (shown in Fig. 1) is composed of cast-iron, and the projections 2, forming the pockets, I prefer to have cast on, as shown in Fig. 1, being cheaper and makes the casing stronger, although I might attach the pocket to the casing in some other form. The outside casing 1 (shown in Fig. 5) is composed, preferably, of red-clay bricks or blocks, but might be made of cement or any suitable material capable of supporting the fire-brick lining 3, as it is intended that this outside casing shall be protected from extreme heat by the fire-brick lining 3, which is composed of a special-made brick or block of a suitable fire-clay mixture that will withstand the temperature of the furnace and protect the outside casing to which it is secured. In some cases, especially in marine work, I would make the outside casing of cast iron or steel, as shown in Fig. 1, and the fire-clay lining 3 I would

make with a large percentage of sawdust or any material that would be consumed while burning the fire-clay bricks or blocks. This would cause recesses forming dead-air spaces, which aid toward making said blocks a non-conductor of heat, thereby protecting the outside casing and preventing loss of heat by radiation. These fire-clay blocks 3 are secured in the outside casing 1 in such a manner as to leave a slight clearance between the sides of the pocket and the brick to provide for the expansion when the brick becomes heated. There is also a clearance between these bricks or blocks 3 where they project beyond the pockets. (Shown more clearly in Fig. 5.) This clearance is made of such a size that when the bricks or blocks become heated the expansion will not be sufficient to make them press against each other, thereby bulging and cracking the outside casing. When sawdust or other similar material is used to form air cells or recesses in blocks 3, I might on the face of these blocks for about two inches omit such material and make them solid, as the face of these blocks on the furnace side would radiate the heat back to the tubes of the boiler better than if the blocks contained these air-cells all the way to the surface on the furnace side. I do not confine myself to securing these blocks 3 to the outside casing by the pocket system only, as I might secure these blocks 3 to the outside casing by means of the anchor-bolt alone or in conjunction with other means. The point that is essential is to have them secured to the casing in such a way as to provide a space between said blocks.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a boiler-furnace the combination of an outer casing with projections on the furnace side and non-combustible blocks secured to said casing protecting the same and extending over the face of said projections to protect them, said blocks being spaced apart to allow for expansion and contraction all substantially as set forth.

2. In a boiler-furnace the combination of an outer casing provided on the furnace side with pockets, of non-combustible blocks secured in said pockets, said blocks extending over the edges of said pockets to protect the same and also being spaced apart to allow for expansion and contraction.

3. In a boiler-furnace, the combination of an outer casing, provided on the furnace side



with projections, of non-combustible blocks  
secured to said projections in such a manner  
as to protect them, said blocks being provided  
with recesses to form in connection with the  
5 casing dead-air cells, the blocks being spaced  
apart to allow for expansion and contraction.  
Signed at New York, in the county of New

York and State of New York, this 26th day  
of October, A. D. 1903.

ELLIS F. EDGAR.

Witnesses:

DAVID GRANT,  
C. T. METCALFE.