

(No Model.)

2 Sheets—Sheet 1.

P. REILLY.  
STEAM GENERATOR.

No. 540,457.

Patented June 4, 1895.

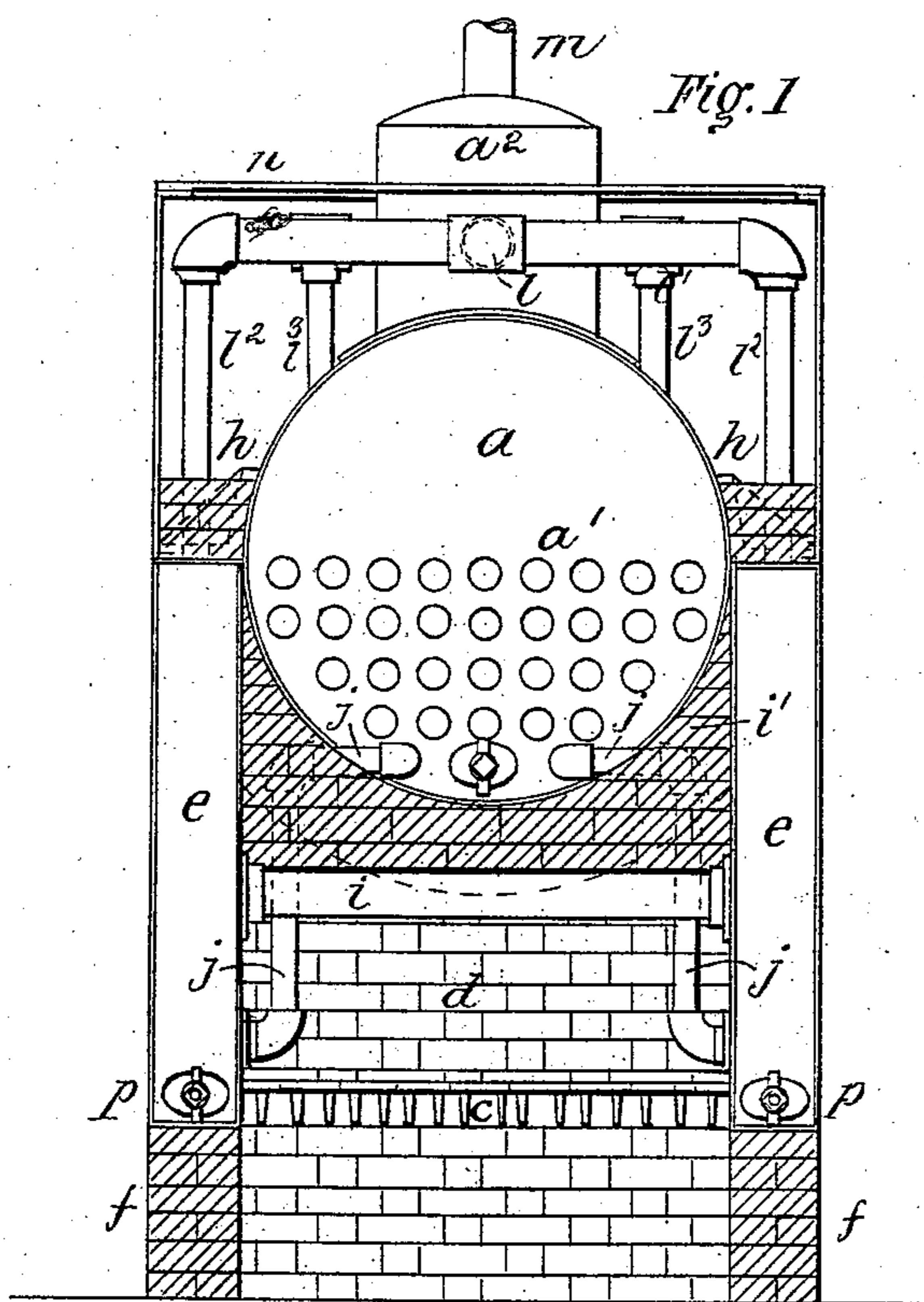


Fig. 1

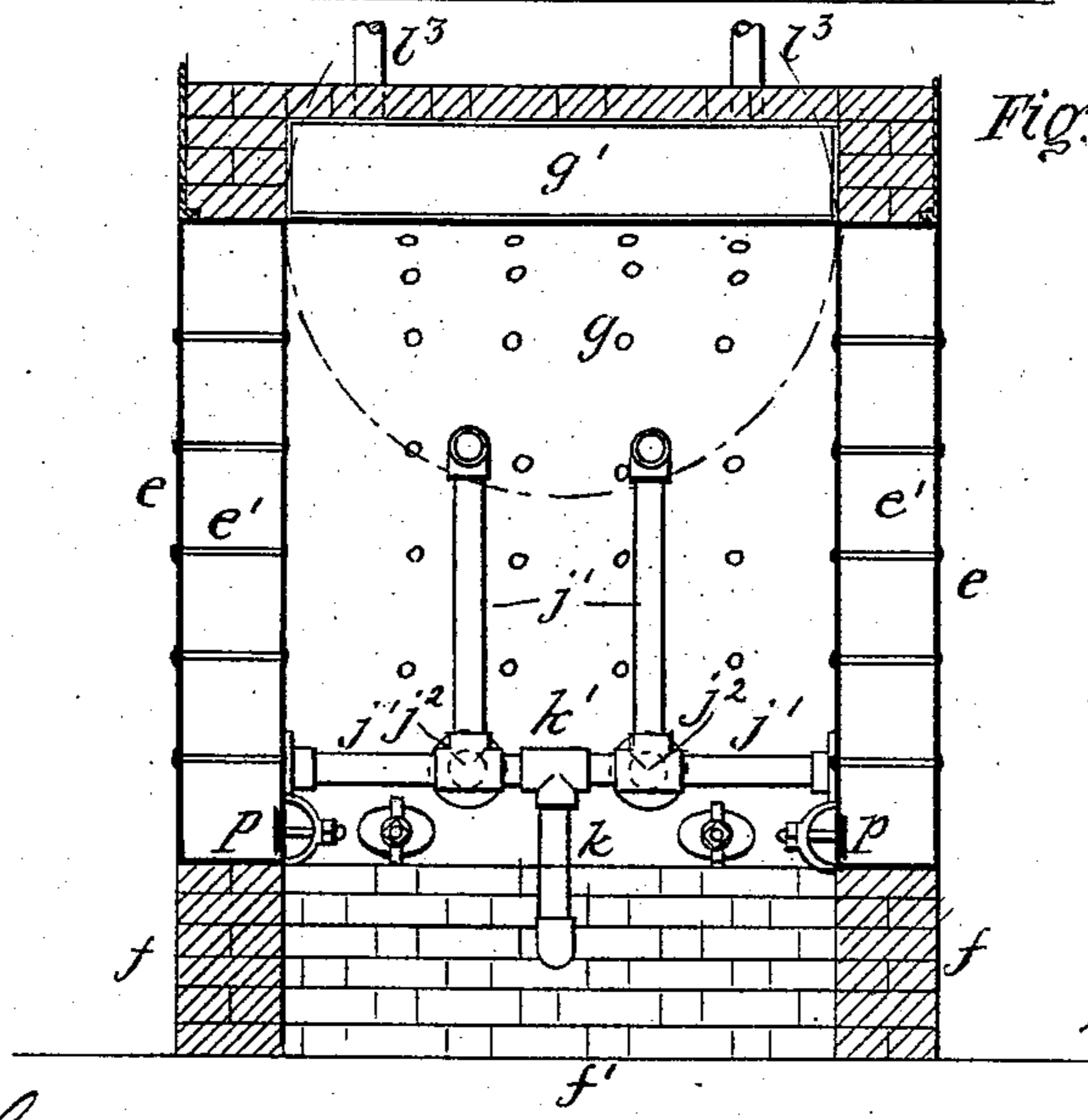


Fig. 3

Witnesses  
*Catharine Georgi*  
*Edward C. Davidson.*

*Patrick Reilly*  
Inventor  
By his Attorney *Alfred Hedlock.*

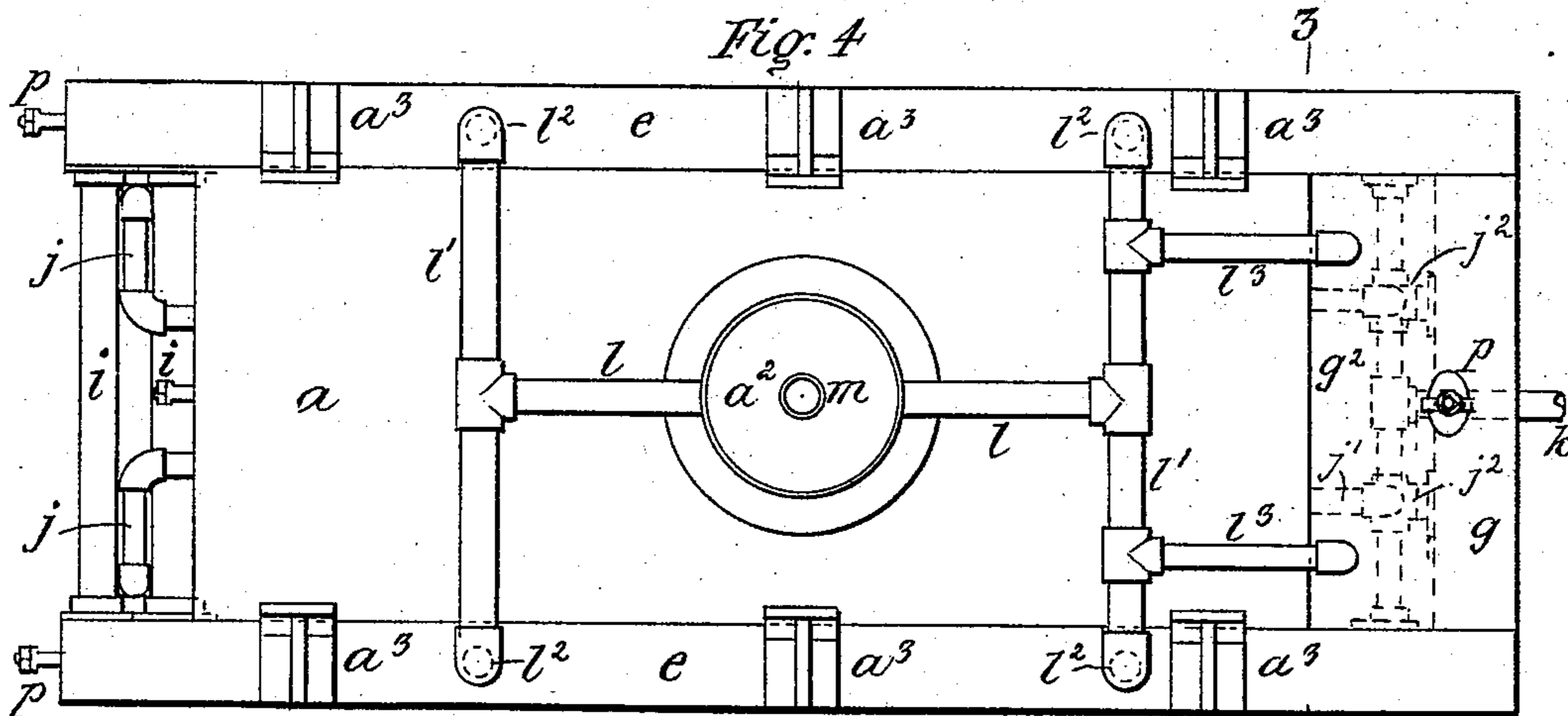
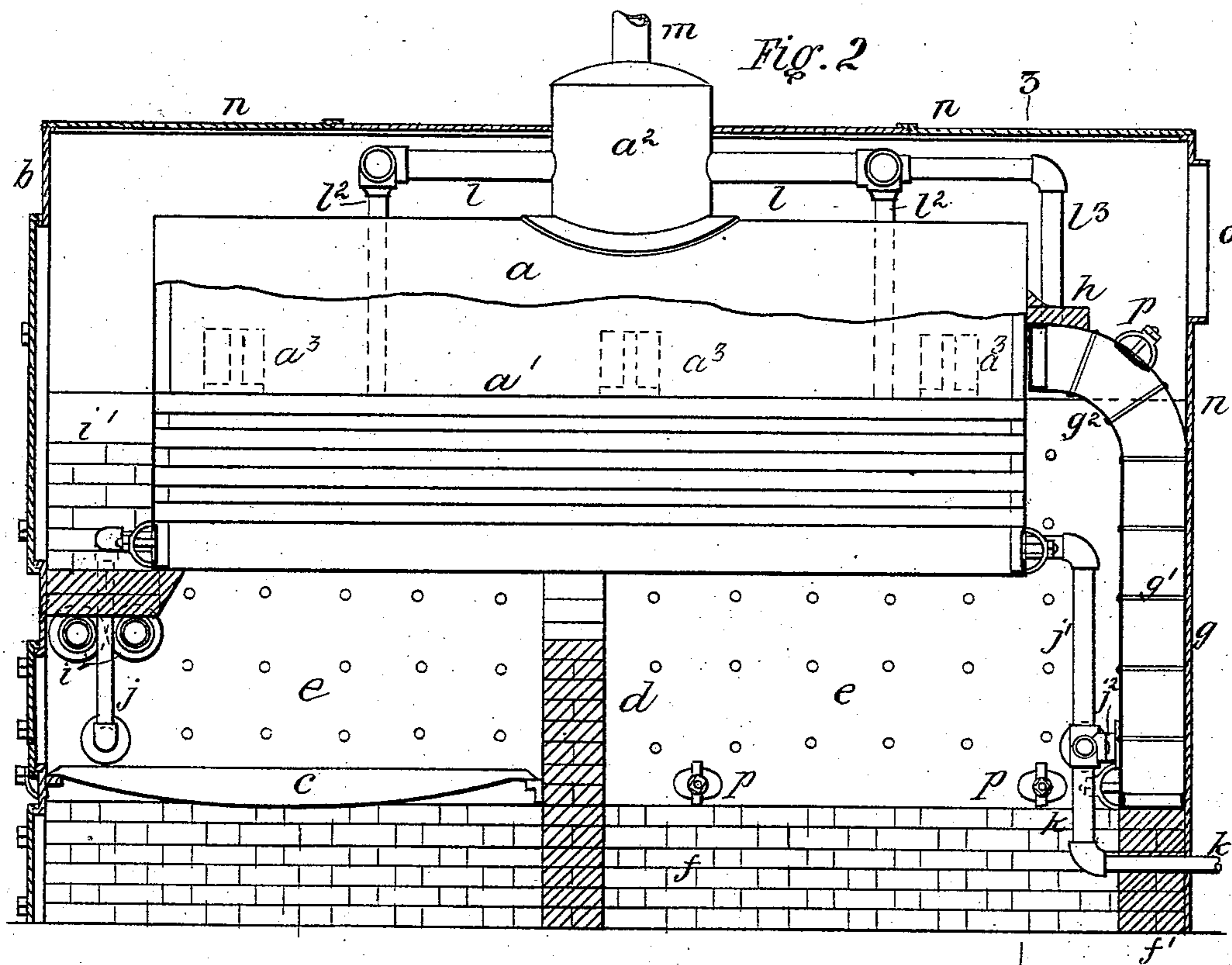
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2 Sheets—Sheet 2.

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STEAM GENERATOR.

No. 540,457.

Patented June 4, 1895.



Witnesses  
Catharine Bengi  
Edward C. Davidson.

Patrick Reilly  
Inventor  
By his Attorney Alfred Sheddock.

# UNITED STATES PATENT OFFICE.

PATRICK REILLY, OF BROOKLYN, NEW YORK.

## STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 540,457, dated June 4, 1895.

Application filed August 4, 1894. Serial No. 519,517. (No model.)

*To all whom it may concern:*

Be it known that I, PATRICK REILLY, a citizen of the United States, and a resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

The improvement in steam generators forming the subject of this invention consists of the combination with a boiler of the horizontal type, of water walls in substitution of the ordinary brick walls upon which the boiler is supported. These water walls are composed of rectangular chambers made in any suitable manner of sheet iron and properly braced and stayed to adapt them to withstand the pressure they are submitted to. The side water walls constitute the side walls of the furnace and are preferably made long enough to extend the full length of the boiler and to the rear wall. They are, by suitable pipes, connected at their lower parts to the water space and at their upper parts to the steam space of the horizontal body. These side water walls may be used with or without the rear water wall, and the rear water wall used with side brick walls, and when the horizontal body is provided with return flues or tubes then the upper part of the rear water wall will be arched forwardly so as to meet the rear end of the body above the flues or tubes. This rear water wall is also connected at the lower part to the water space, and at its upper part to the steam space of the body, and also in some cases it is connected directly to the side water walls. The most perfect results are had when my improved water walls are applied as both side walls and rear wall to a horizontal cylindrical body having return flues or tubes so that the heat due to the combustion of fuel in the furnace acts only on useful steam generating surfaces, and it is to this class of boiler the water walls are shown applied in the accompanying drawings, the manner of their application and details of construction being hereinafter set forth in the description of the drawings, in which—

Figure 1 is a front elevation of the completed steam-generator with the front removed. Fig. 2 is a central vertical longitudinal section of the same. Fig. 3 is a transverse vertical section on the line 3 3, Figs. 2

and 4, looking toward the rear water-wall; and Fig. 4 is a plan view showing the boiler proper, the water-walls, and their pipe connections.

The cylindrical body or main portion *a* of the generator is of the ordinary construction, being provided with the tubes *a' a'* extending lengthwise through it, the steam dome *a<sup>2</sup>* on its upper side, and the supporting brackets *a<sup>3</sup> a<sup>3</sup>* secured to its side. The front *b* with its usual doors, &c., the grate *c* and bridge or rear wall *d* of the furnace are also of the usual construction. The two side walls are composed of rectangular sheet metal chambers *e* *e*, suitably braced and stayed by the rods *e' e'*. They rest on the foundation brick walls *f f* with their bottoms a little below the grate surface of the furnace, and the cylindrical body *a* is supported on their upper sides by brackets *a<sup>3</sup> a<sup>3</sup>* resting thereon. These side water walls are shown extending the entire length of the generator and between them at their rear ends is placed the rear water wall *g* also properly braced and stayed by the rods *g' g'*. This water wall rests on the rear part *f'* of the foundation and its upper part *g<sup>2</sup>* is arched forwardly so as to meet the rear end of the cylindrical body *a* above the tubes *a' a'* as shown at Figs. 2 and 4.

The junctures between the cylindrical body *a*, the side water walls *e e* and rear water walls *g*, are closed so as to insure a perfect draft and proper direction to the products of combustion, and this is preferably done by applying at these parts asbestos packing with an overlay of bricks and cement *h*.

Between the side water walls *e e* at the front part of and in the furnace are placed the pipes *i i* connected to and forming passage ways between the water walls *e e*. These pipes *i i*, therefore brace and tie the side walls together and also act as supports for the fire arch *i'*, which separates the furnace from the front end of the cylindrical body *a*.

Water pipes *j j* connect the water walls *e e* at their front lower ends to the front lower part of the body *a*, and the water pipes *j' j'*, connect these side walls to the body in a similar manner at their rear ends, and also by the branches *j<sup>2</sup> j<sup>2</sup>*, form communications between the lower part of the rear wall *g*, and the lower part of the body and to the side walls *e e*.

The water supply pipe  $k$  is also shown connected to these pipes  $j'j'$  by joining a straight branch  $k'$  placed between the bends of the pipes  $j'j'$  thus insuring a perfect supply of  
 5 water to all of the water walls  $e e$  and  $g$  and to the cylindrical body  $a$ . The water supply pipe  $k$  may be applied in any other suitable manner, as may also the pipes connecting the lower parts of the water walls and cylindrical  
 10 body, as will insure a proper circulation of water between them.

From the steam dome  $a^2$  extend the pipes  $l$ , joining the cross pipes  $l' l'$  and to these pipes  $l' l'$  are connected the upper surfaces of the  
 15 side water walls  $e e$  by the vertical pipes  $l^2 l^2$  and the upper surface of the arched top  $g^2$  of the rear water wall  $g$ , by the pipes  $l^3 l^3$ . By this simple arrangement of pipe connections all steam generated in the water walls passes  
 20 directly to the steam dome of the cylindrical body and with the steam generated in said body passes from the generator through the pipe  $m$ .

The casing of the generator is shown as consisting of metal plates  $n n$ . It may be made  
 25 in any other suitable manner. The products of combustion in the furnace act on the side water walls  $e e$  as well as on the lower part of the cylindrical body  $a$  and after they pass  
 30 over the bridge wall  $d$  they also act on the side walls and the rear wall  $g$ , as well as on the body, and are consequently surrounded by active surfaces in their transit from the furnace to and through the body to the front of  
 35 the generator over the fire arch  $i'$ , from whence they pass over the body to the exit flue opening  $o$  at the rear of the generator.

The water walls  $e e$  and  $g$  are provided with hand holes  $p p$  for cleansing purposes.  
 40 Where my improved water walls are to be applied to cylindrical boilers arranged, two or more, side by side, then a side wall between two adjacent sections or boilers may be made common to both, thus causing a saving  
 45 in the application of my invention in such cases.

I claim as my invention—

1. In a steam generator, the combination of  
 50 a horizontal body, with return flues or tubes, a rear water wall extending the full width of the body and arched at its upper end to meet the rear of the body above the flues or tubes, pipe connections between the body and the rear water wall, and side water walls upon

which the body is supported extending beyond the rear end of the body and embracing the rear water wall, pipe connections between the body and side water walls, and between the rear water wall and side water walls.

2. In a steam generator, the combination of  
 60 a horizontal body with return tubes or flues, two side water walls extending beyond the front end of the body, a furnace, at the front part, tubes connecting the side water walls at the front upper part of the furnace forming  
 65 a connection between the walls forward of the front end of the body, a fire arch supported by these tubes, pipe connections between the side water walls and the body, and a rear wall.

3. In a steam generator, the combination of  
 70 a horizontal body with return tubes or flues, two side water walls extending beyond the front and rear ends of the body, a furnace at the front part, tubes connecting the side water walls at the front upper part of the furnace, a fire arch supported by these tubes,  
 75 pipe connections between the side water walls and the body, a rear water wall embraced by the rear parts of the side walls and arched at its upper end to meet the body above the flues or tubes, and pipe connections between the body and the rear water wall.

4. In a steam generator, the combination of  
 85 a horizontal body, side water walls extending beyond the front and rear ends of the body, and a rear water wall between the rear parts of the side walls forming a heating chamber with the under side of the body, pipe connections between the body and the water walls  
 90 connecting the upper parts of the water walls to the steam space of the body, pipe connections between the lower part of the side water walls and the body at the front parts thereof, pipe connections between the rear ends of the  
 95 side water walls, the lower part of the rear water wall and the lower rear part of the body and a water supply pipe connected to these rear lower connecting pipes.

In testimony that I claim the foregoing as  
 100 my invention, I have signed my name, in presence of two witnesses, this 3d day of July, 1894.

PATRICK REILLY.

Witnesses:

ALFRED SHEDLORH,  
 EMANUEL J. EVERS.