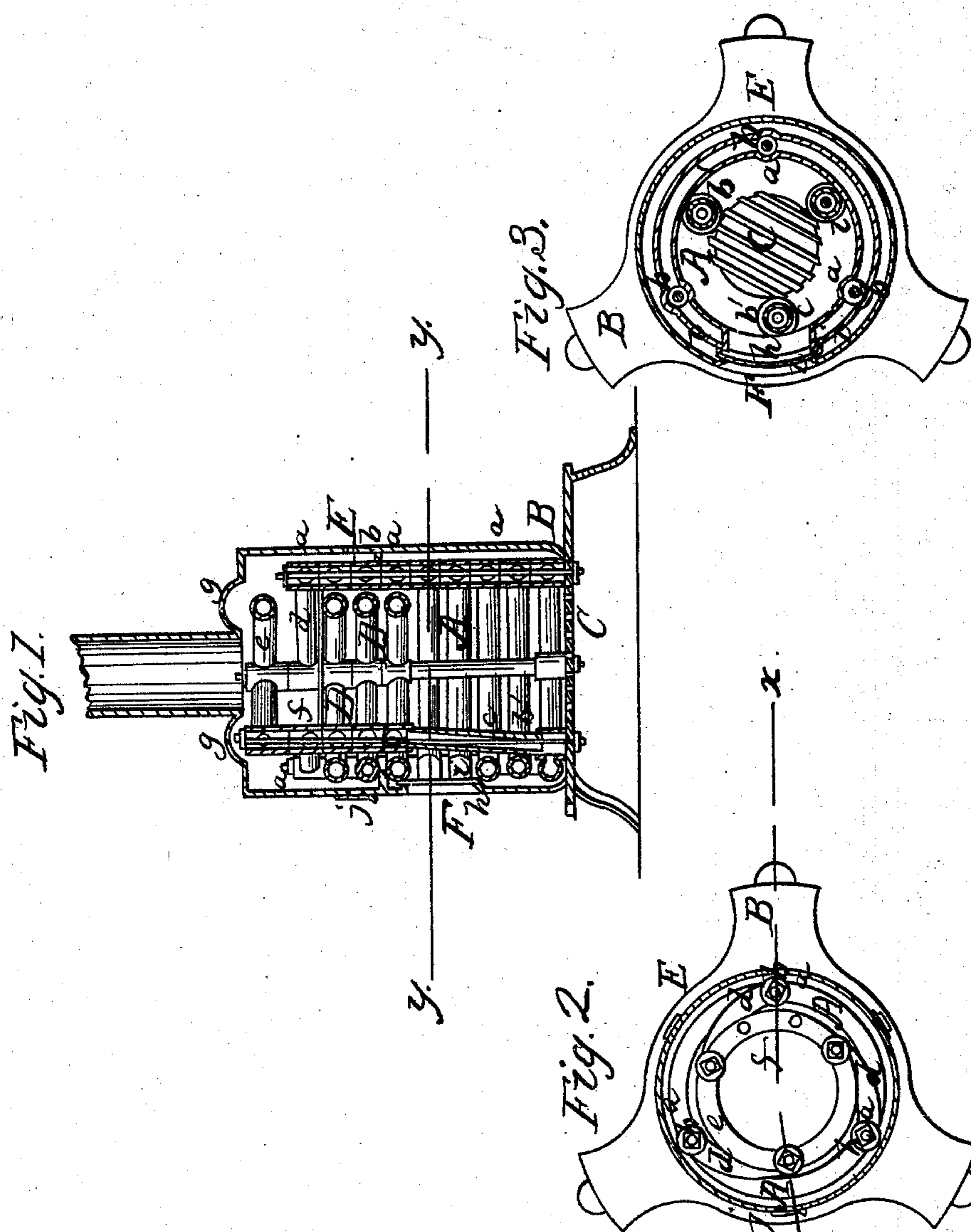


*R. & H. V. Farries,*  
*Steam-Boiler Water-Tube.*  
*N<sup>o</sup> 47,627.      Patented May 9, 1865.*



*Witnesses*

*W. L. Toole*  
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# UNITED STATES PATENT OFFICE.

ROBERT FARIES AND HENRY V. FARIES, OF INDIANAPOLIS, INDIANA.

## IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 47,627, dated May 9, 1865.

*To all whom it may concern:*

Be it known that we, ROBERT FARIES and HENRY V. FARIES, of Indianapolis, in the county of Marion and State of Indiana, have invented a new and Improved Steam-Generator; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical central section of this invention, the line *x x*, Fig. 2, indicating the plane of section. Fig. 2 is a plan or top view of the same, the outside case having been removed to expose the interior of the steam-generator. Fig. 3 is a horizontal section of the same, the line *y y*, Fig. 1, indicating the plane of section.

Similar letters of reference indicate like parts.

This invention relates to a steam-generator, the distinguishing feature of which consists in its being constructed principally of circular and semicircular pipes secured together by bolts and provided with transverse openings or eyes, which form the communication between the adjacent sections of pipes and give a free passage to water and steam through the entire structure. Two or more sets of pipes are arranged one inside the other, and connected at top and bottom so that steam and water can pass freely through the entire series of pipes. Suitable sheets placed on the top of the inner and outer series or coils of pipes serve to deflect and equalize the heat throughout the entire boiler, and those pipes opposite the fire-door are cut off and their ends closed and provided with dovetailed flanges, so that a frame can be attached thereto to support the fire-door.

A represents a series of pipes, which are curved or bent to a circular, semicircular, or other desirable shape, and provided with transverse holes or eyes *a*, by means of which the several pipes communicate with each other, as shown in Fig. 1. These eyes may also serve to admit bolts *b*, by means of which the pipes A are secured together, and in that case the water and steam circulating through the eyes pass round the bolts; but, if desired, the pipes A may be provided with flanges furnished with holes to receive the bolts, and in that

case the eyes *a* serve merely as passages through which the communication between the several pipes is effected.

The pipes A are secured on the bed-plate B, and they surround the grate C, which may form a portion of the plate B, or which may be constructed of a series of grate-bars placed in a circular opening in said plate. The pipes A also surround a series of pipes, D, which are coiled or curved to correspond to the interior of the pipes A, and connected to each other in a manner similar to the pipes A. Said inner pipes do not extend down to the bed-plate B, and they connect with the pipes A at the bottom by eyes *b'* and vertical pipes *c* and at the top by segments *d*, which are provided with an eye at each end, one to fit to an eye of the outer and the other to an eye of the inner coil of pipes. The inner ends of these segments *d* are finally connected by a circular pipe, *e*, which is provided with a series of eyes equal in number to the segments, so that a complete circulation of water and steam is effected. This last-named circular pipe forms a steam-dome, which contains dry steam, and from which the steam is taken to the engine or other place where it is to be applied. Any desirable number of such pipes may be applied.

The inner coil of pipes is closed on top by a deflecting-plate, *f*, which serves to equalize the heat, and a deflecting-plate, *g*, covers the outer coil. The plate *g* forms the top of the casing E, which surrounds the coil A, and which is secured to the bed-plate B by screw-bolts or other suitable means. The same screw-bolt which fastens the inner and outer coils together may also be used to secure the casing E to the bed-plate B, as shown in Fig. 1 of the drawings.

In order to get access to the fire space in the interior of the coils of pipes, a fire-door, F, is provided, which communicates with the interior through a hole, *h*, cut out of the outer coil, as shown in Figs. 1 and 3. The ends of the pipes which form the edges of the hole *h* are closed and protected by a frame, *i*, which fits over dovetailed flanges *i*, attached to said ends of the pipes, as clearly shown in Fig. 3 of the drawings. This frame secures the ends of the pipes and prevents the same from opening outward in consequence of the unequal pressure on the inside and outside area of said pipes.

The casing is provided with a number of dampers, *j*, which are for the purpose of admitting air into and above the furnace, and a rib or annular flange, *k*, on the inside of said casing, fits close up to the outside circumference of the outer coil, and serves to throw the air into the furnace while the lower dampers are opened, and prevents the air and heat from running up on the outside too freely. This flange may be made separate from the casing and fastened thereto by any suitable means.

By these means a steam-generator can be produced which combines simplicity and cheapness of construction with great durability, from the fact that cast-iron can be employed with advantage in the construction of the principal parts of the same, and that this material will stand more heat than wrought-iron without being liable to corrode or rust. Furthermore, by the use of this generator great economy in fuel is effected, on account of the extensive heating-surface condensed in a comparatively small space, and of the great facility for admitting air into and above the furnace for completing combustion.

We are aware that tubes connected on the same principle as ours are described in an application of M. B. Hand, rejected in 1855.

Our invention is greatly superior to the above by reason of the greater freedom and completeness of circulation of water which is produced by the action of heat in coiled or circular pipes.

We claim as new and desire to secure by Letters Patent—

1. A steam-generator constructed of rings of pipes *A*, communicating with each other through transverse holes or eyes *a*, in the manner and for the purpose substantially as set forth.

2. The combination of two or more coils, *A D*, communicating with each other by eyes *a b'* and pipes *c d*, substantially as and for the purpose described.

3. The deflecting-plates *f g*, in combination with the coils *A D*, applied and operating substantially as and for the purpose specified.

4. The dovetailed flanges *i'* and frame *i*, in combination with the pipes *A* and fire-door *F*, constructed and operating substantially as and for the purpose set forth.

ROBERT FARIES.  
HENRY V. FARIES.

Witnesses:

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THOMAS GOTT.