3 Sheets--Sheet 1.

J. RYAN.

Steam Generators.

No. 141,239. Patented July 29, 1873.

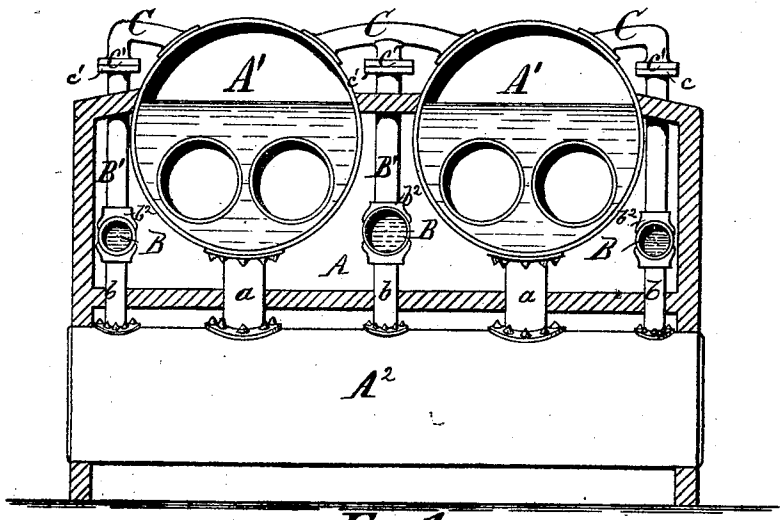


Fig. 1.

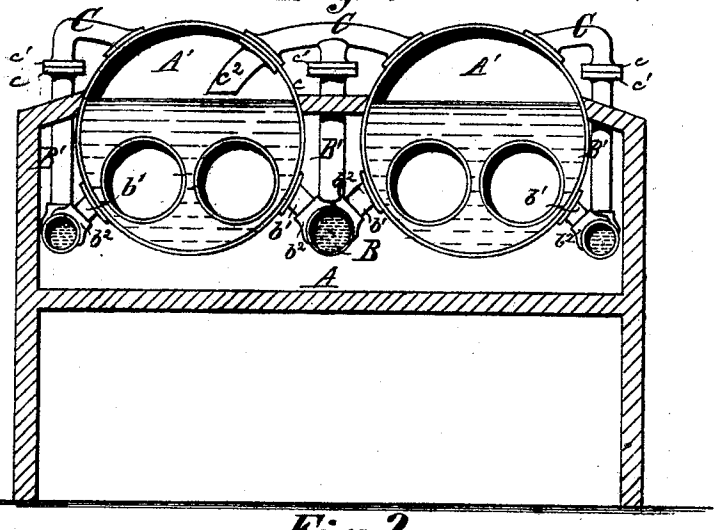


Fig. 2.

WITNESSES.

Robert Burns.

Charles Meisner

INVENTOR.

Joseph Ryan

per Horthel & Co

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS)

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J. RYAN.

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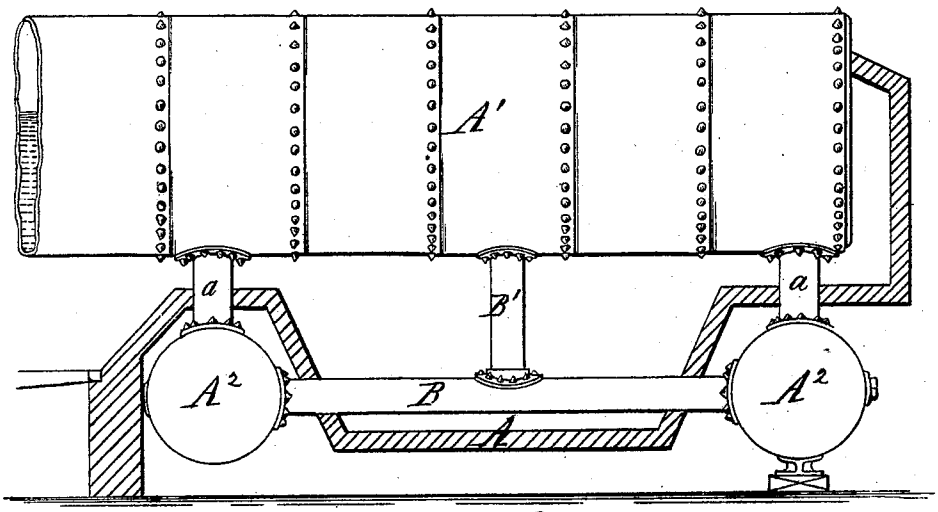


Fig. 3.

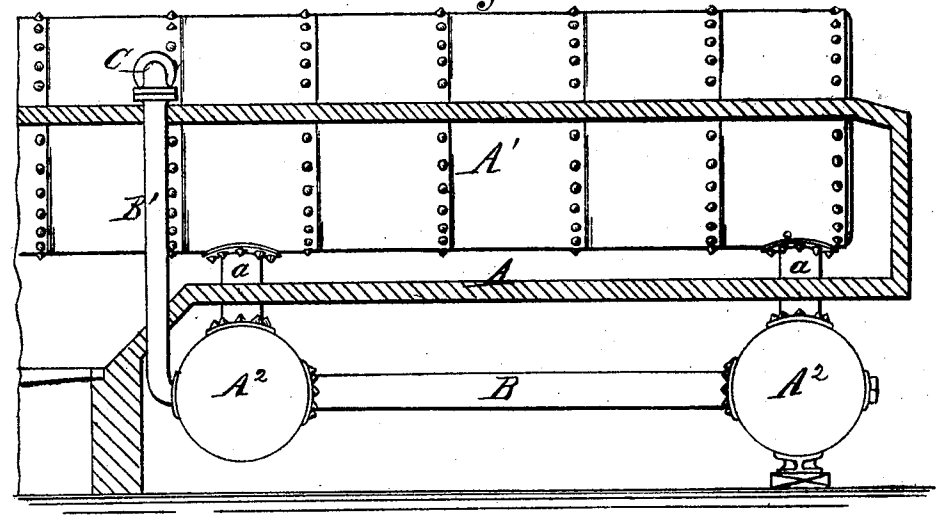


Fig. 4.

WITNESSES.

Robert Burns.

Charles Meisner.

INVENTOR.

Joseph Ryan
per Kirkhill & Co
attys

A.M. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

3 Sheets--Sheet 3.

J. RYAN.

Steam Generators.

No. 141,239. Patented July 29, 1873.

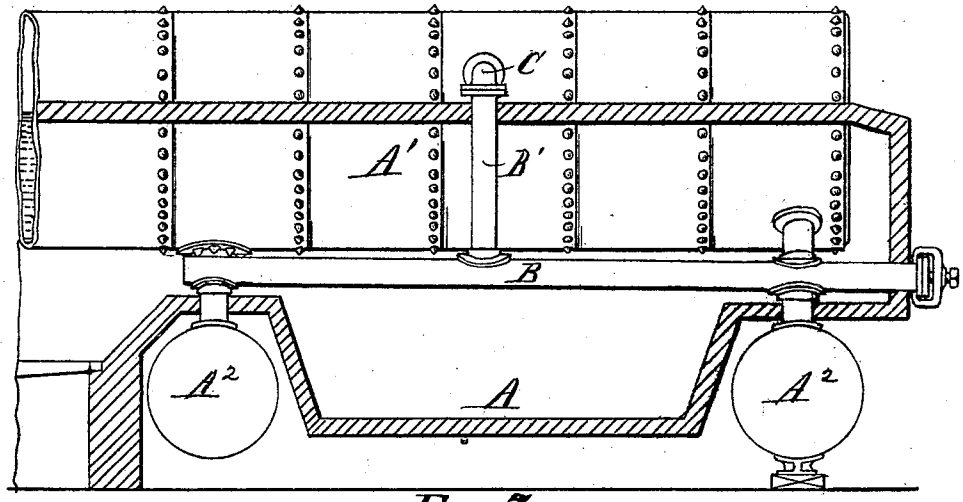


Fig. 5.

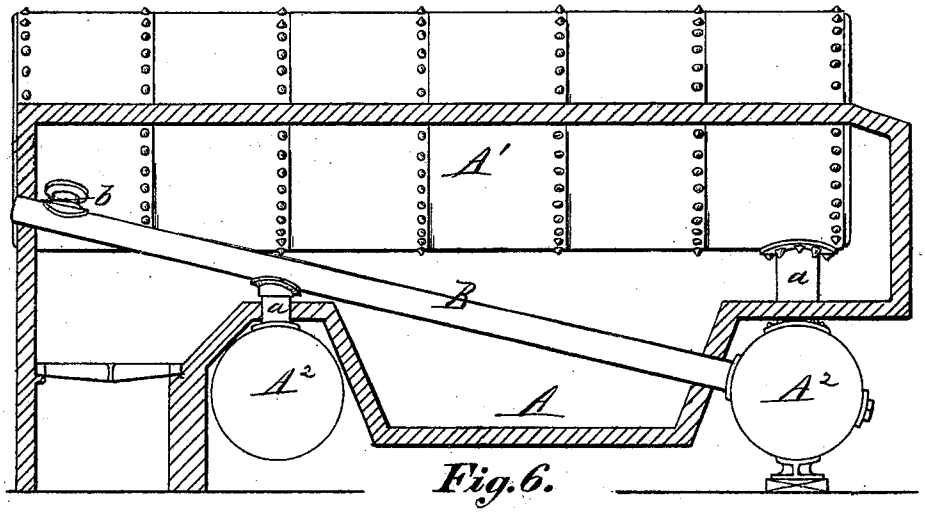


Fig. 6.

WITNESSES.

Robert Burns

Charles Meisner

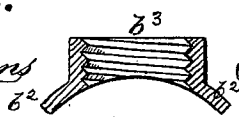


Fig. 7.

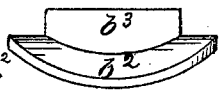


Fig. 8.

INVENTOR.

Joseph Ryan

per Kerthel & Co

attys.

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS)

UNITED STATES PATENT OFFICE.

JOSEPH RYAN, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **141,239**, dated July 29, 1873; application filed August 22, 1872.

To all whom it may concern:

Be it known that I, JOSEPH RYAN, of St. Louis, in the county of St. Louis and State of Missouri, have made a new and useful Improvement in Steam-Generators for Steam-Boilers; and I do hereby declare that the following is a full and true description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

In order to adapt my improved apparatus to the various capacities of boilers, their location, their connection with or without drums, and the different formations of fire-beds, and also as regards other ordinary appurtenances belonging to steam-boilers, and especially to form a more simple, readily-applied, and more practically effective process of generating steam—also, to insure a perfect circulation, and establish a more uniform equalization of pressures within and from boiler to boiler—the nature of this invention can therefore be stated to relate to the peculiar combination of pipes and parts with relation to boilers or drums, as will hereinafter more fully appear.

To enable those herein skilled to make and use my said improvements, I will now more fully describe the same, referring to—

Figures 1 and 2, Sheet 1, as transverse sections; Figs. 3 and 4, Sheet 2, as longitudinal sectional elevations; Figs. 5 and 6, Sheet 3, as longitudinal sections; while Fig. 7 is a transverse section of saddle, and Fig. 8 side elevation of same.

A represents the fire-bed; A^1, steam-boilers; A^2, mud-drums, connecting to boilers by legs *a*. B represents my improved main circulating-pipe, arranged on each side of boilers A^1. The circulator B can be connected, by proper legs or pipes *b*, to mud-drums A^2, (see Figs. 1, 5, and 6,) or, by branch legs b^1, directly to lower side of boilers, as shown in Fig. 2. To the main circulator B I provide one or more upright circulating-pipes, B′. (See Figs. 1, 2, 3, 4, and 5.) In order, however, to form a more perfect steam-tight joint, the connection of the vertical pipes B′ to top of circulators B will be by a saddle, b^2, formed with a threaded head, b^3, as shown in Figs. 7 and 8. The saddle b^2 is properly bolted or riveted to the out and inside top of circulator B, while the screw-head b^3 is fitted to receive and secure the lower ends of the upright circulator B′, as indicated in Figs. 1 and 2. Especially is this improved joint advantageous where the joints or connections are exposed to the heat of the furnace or fire-bed. The upright pipes B′ connect, further, to the top of the boiler by a single goose-neck or double branch pipes C, (see Figs. 1, 2, 4, and 5,) the connection of pipes C with B′ being by flanges *c* c^1, with which the ends of each pipe are provided, the joint being completed by uniting said flanges by rivets or bolts, as ordinary.

The connection of the top-branch pipes C to boilers can be directly made in any ordinary steam-tight manner. My object, however, being to avoid all undue turmoil, spraying, and foaming within boiler, and especially to guard against the injurious effects arising from the ordinary indirect introduction of circulation and steam to a cold-water surface, and its effects passing through the circulating apparatus, I have provided the top pipe C with extensions or bonnets c^2, fitted to reach within and in close proximity to the water-line, as clearly shown in Fig. 2.

By such an arrangement and construction of parts, the circulation passes from boilers through main circulating-pipe B; from thence passes through upright pipes B′, and discharges through top pipes C into and near the water-line of boiler. Also, it will be noted that whatever excess of water (owing to the expansive force of steam and unequal distribution of heat to boilers) exists in one or any boiler, is counteracted by the circulation through the circulating apparatus, which thus equalizes the pressures from boiler to boiler, and establishes a uniform process of generation. The circulator arranged within fire-bed utilizes the heat and serves generation.

Fig. 3 shows the arrangement of main circulator B, also within the fire-bed, but connected to mud-drums A^2. In this case the circulation is taken from the drums and discharges through one or more legs or stand-pipes, B′, into the bottom of boiler. Short pipes can thus be used, and the entire circulating apparatus be arranged out of the way of boilers. Also, this arrangement dispenses with drum-legs, and is well adapted for that

form of fire-beds. Further, it will be noted that the upright pipes B′ and top pipes C can be used in this form, so that the discharge can be effected either at bottom, or side, or top of boilers.

In Fig. 4 the main circulator B is shown arranged entirely without the fire-bed, the upright pipes B′ connecting at its lower end to end side of the drum A^2, and discharging through goose-neck pipe C in the top of boiler. By this arrangement the connecting-joints are outside of the fire, and the front legs are protected by taking the circulation at front from drums.

In Fig. 5 the circulator B is shown connected with the legs of drums A^2, and the end extended and provided at its extremity with a proper hand-hold plate, for purpose of cleansing said pipe. The circulation discharges through vertical pipe B′ and top pipe C into top of boiler. By this arrangement, a shorter circulator can be used and adapted to pass merely from rear end of boiler to back end of the grate-bars.

In Fig. 6 the distinguishing peculiarity consists in connecting to the rear mud-drum A^2, in an inclined position, the main circulator B, and further connecting same at its forward end, by branch pipe *b*, to forward side of boilers. The circulation in this case is therefore obtained from the coldest part of the boiler, and discharged into the hottest part thereof.

My improved apparatus, in its principle of construction, can thus be arranged, applied, and operated without reference to any particular arrangement of the circulating-pipes, as these, being few and simple, can readily be varied in location, manner, and connection, as the emergencies of each case demand.

Having thus fully described my said improvements, what I claim is—

The circulating-pipes B, vertical pipes B′, top discharge-pipe C, saddle-joint b^2, screw-heads b^3, flange-joints c c^1, arranged in combination either directly with boilers or drums, as described and shown.

In testimony of said invention I have hereunto set my hand.

JOSEPH RYAN.

Witnesses:

WILLIAM W. HERTHEL,

ROBERT BURNS.