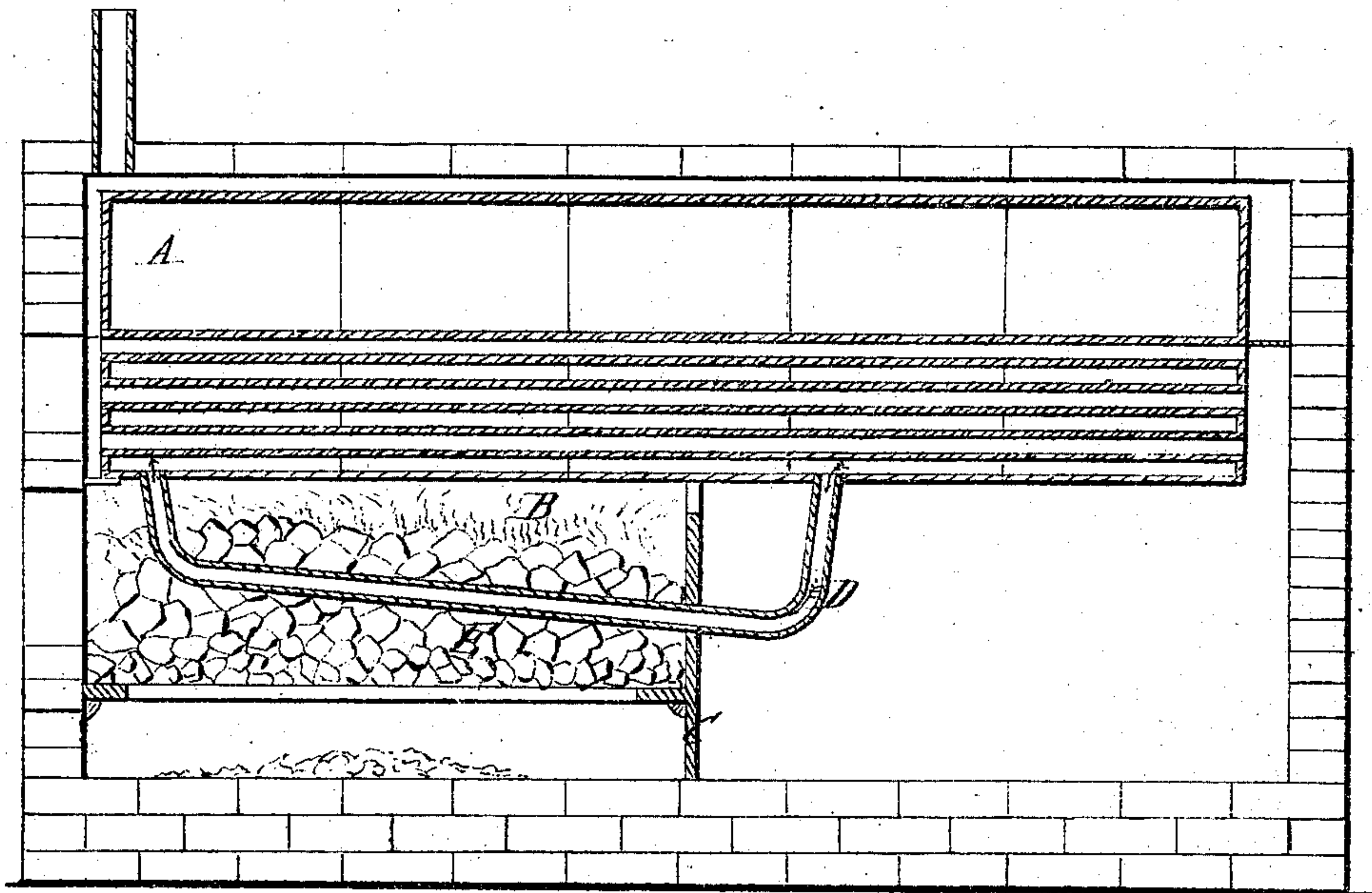


Samuel W. Emery and E. P. Doyen
Imp'd Steam Generator

117613

PATENTED AUG 1 1871



Witnesses
F. B. Curtis
J. M. Hyne.

Inventors
E. P. Doyen,
S. W. Emery,
Chipman & Foster & Co.
Attys.

UNITED STATES PATENT OFFICE.

SAMUEL W. EMERY AND ERASMUS P. DOYEN, OF PORTLAND, MAINE.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 117,613, dated August 1, 1871.

To all whom it may concern:

Be it known that we, SAMUEL W. EMERY and ERASMUS P. DOYEN, of Portland, in the county of Cumberland and State of Maine, have invented a new and valuable Improvement in Steam-Generators; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing making a part of this specification, and to the letters and figures of reference marked thereon.

The drawing is a representation of a vertical longitudinal section of our invention.

This invention has relation to steam-boilers; and it consists in the arrangement of a series of pipes communicating with the boiler with relation to the fire-box, so that the greater part of said pipes shall be surrounded by the burning fuel, the object being to cause the water of the boiler to circulate through said pipes and be thereby converted into steam in the most rapid and economical manner.

In the accompanying drawing illustrating this invention, A represents an ordinary horizontal steam-boiler, underneath which is located the fire-box B, terminating at the bridge-wall C. D represents one of a series of pipes connected with the boiler behind the bridge-wall, and thence passing in horizontal or inclined directions through the body of the burning fuel, indicated by E, so as to be surrounded thereby.

We are aware that pipes have been made to pass underneath steam-boilers for the same pur-

pose as our invention, but they have invariably been located above the fire, and not surrounded by it. There is, however, comparatively little advantage resulting from such an arrangement. The water is simply made to pass through limited or narrow pipes located in precisely the same manner as the boiler, receiving the heat from below the same as it does. We arrange our pipes so as to pass directly through the body or center of the burning fuel; consequently the heat to them is from above, below, and every side, and from its intensity the water is rapidly converted into steam and a considerable saving of fuel effected, because the pipes may be so placed that a small amount of fuel in the fire-box will be sufficient to cover them. The water becomes heated in the tubes and passes on upward toward the front of the boiler, while that which is in the latter descends to take its place, thus keeping up a continuous circulation during the process of generating steam.

We claim as our invention—

The arrangement of the boiler A, fire-box B, and U-shaped heating-tubes D extending below the surface of the fuel, substantially as specified.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

SAMUEL W. EMERY.
ERASMUS P. DOYEN.

Witnesses:

WARREN ROBINSON,
GEO. C. PETERS.