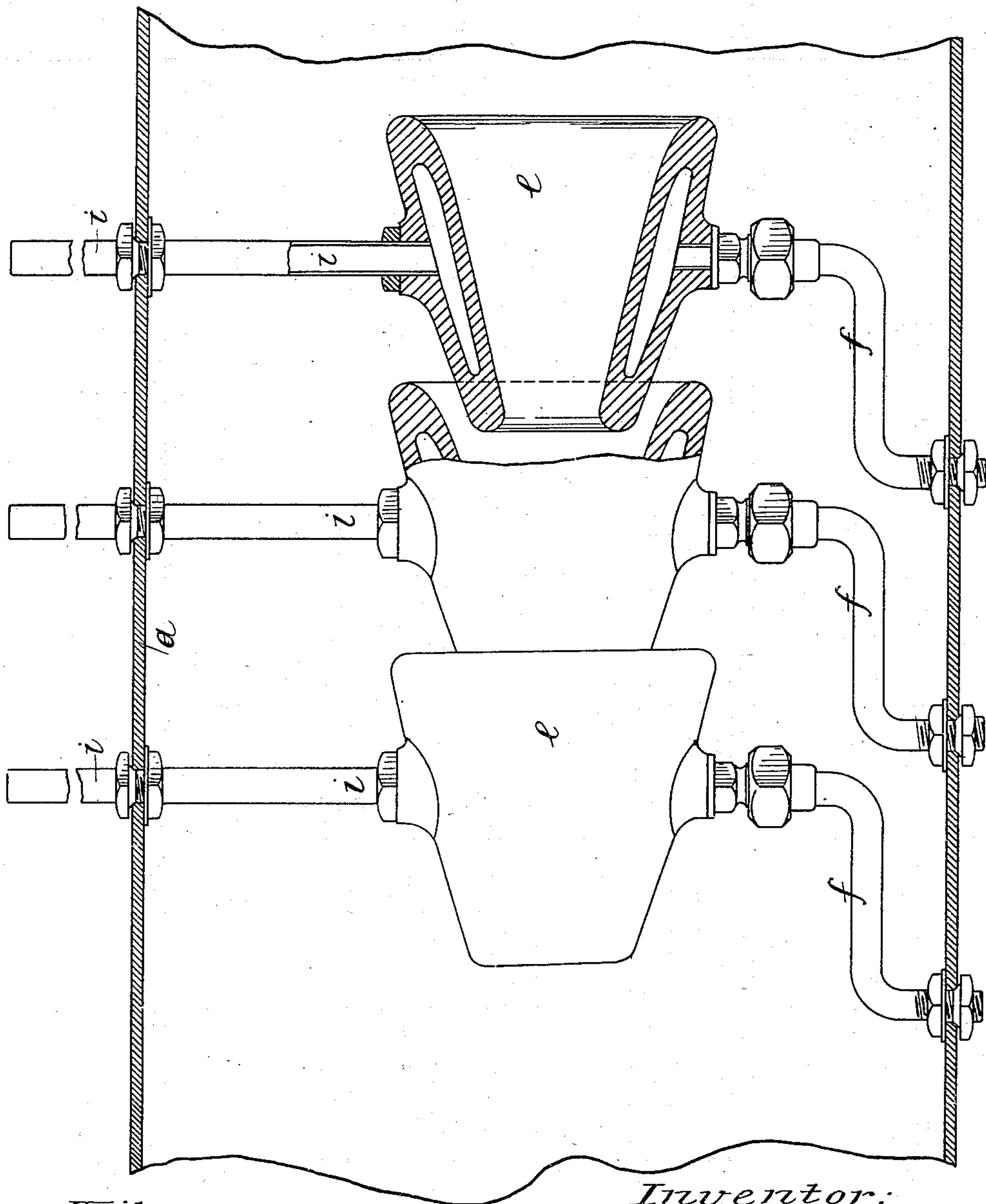


(No Model.)

E. MAKIN, Jr.
STEAM GENERATOR.

No. 604,496.

Patented May 24, 1898.



Witnesses:

E. R. Holton
Otto Munn

Inventor:

Edward Makin Jr.

By *Richardson*

his Attorneys.

UNITED STATES PATENT OFFICE

EDWARD MAKIN, JR., OF MANCHESTER, ENGLAND.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 604,496, dated May 24, 1898.

Application filed May 20, 1897. Serial No. 637,394. (No model.) Patented in England August 6, 1896, No. 17,358.

To all whom it may concern:

Be it known that I, EDWARD MAKIN, Jr., a subject of the Queen of Great Britain, and a resident of 40 New Brown street, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Steam Generators and Superheaters and Water-Heaters, (for which I have obtained Letters Patent in Great Britain, No. 17,358, bearing date August 6, 1896,) of which the following is a specification.

My invention relates to steam-generators, and particularly to that class in which furnace-tubes are employed.

In the drawing I show a furnace-tube in section with my improvement in place, partly in section and partly in side elevation.

In the drawing, *a* is the furnace-tube. Within it are arranged the hollow-walled cones *e e*, with their larger ends toward the furnace, so as to receive therein the products of combustion. The small end of one cone projects into the large end of the next cone,

with a space between for the free passage of the hot products. Pipes *f* and *i* lead from these hollow-walled cones through the shell of the furnace-tube to the water-space of the boiler, said pipes extending in opposite directions, and through these the water circulates and passes through the hollow-walled cones, so that it is exposed to the hot products.

I claim—

In combination with the tube, a series of hollow-walled cones therein with their smaller ends directed into the larger ends of the adjacent cones with spaces through, around and between the cones for the circulation of the hot products and the independent pipe connections *f, i*, between the hollow-walled cones and the water-space of the boiler.

In witness whereof I have hereunto set my hand in presence of two witnesses.

EDWARD MAKIN, JR.

Witnesses:

S. D. GILLET,
HERBERT R. ABBEY.