

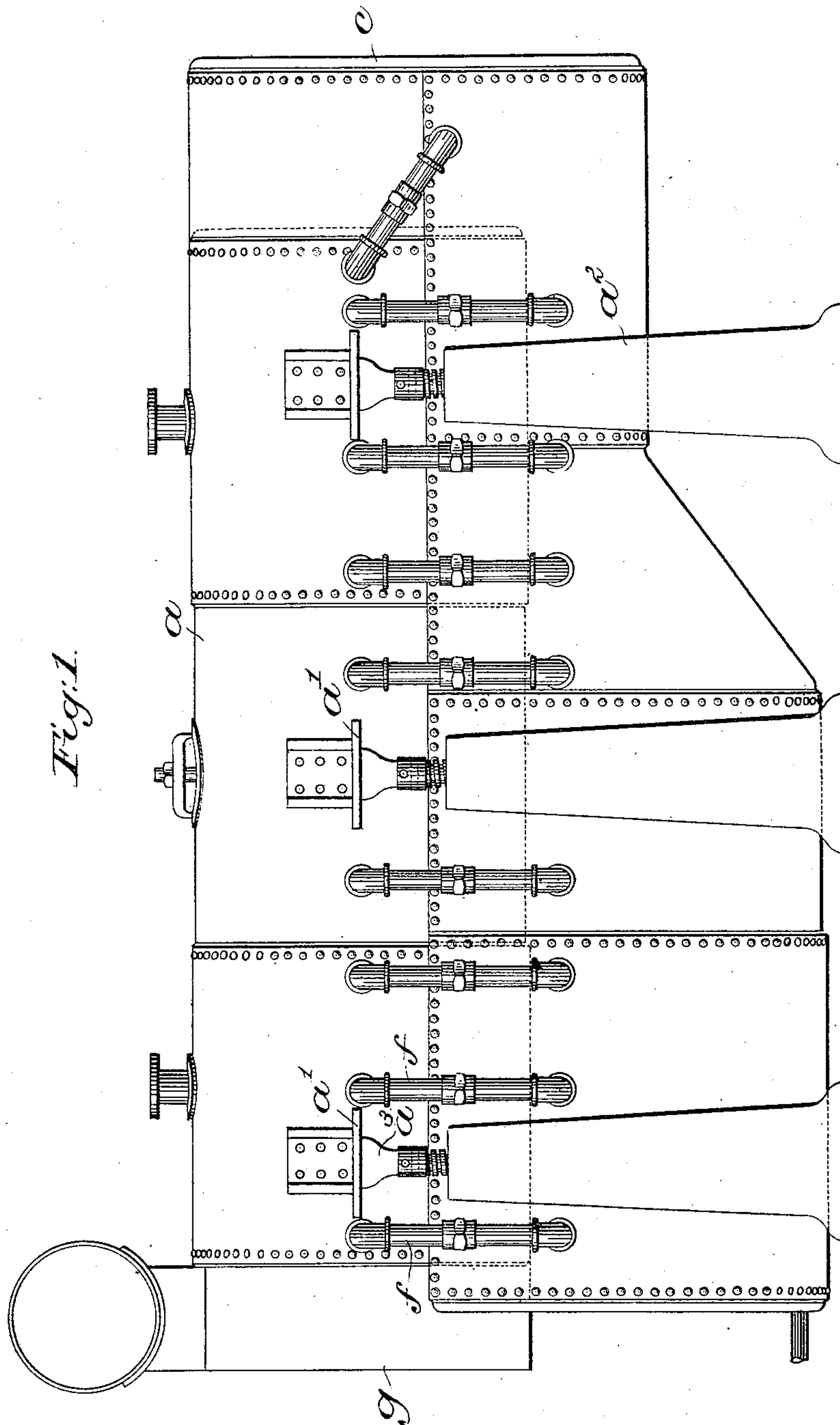
(No Model.)

3 Sheets—Sheet 1.

J. F. BLISS.
BOILER FURNACE.

No. 459,435.

Patented Sept. 15, 1891.



Witnesses.
Edward F. Allen
Edgar A. Goddin

Inventor.
James F. Bliss.
By Lemby H. H. H. H.

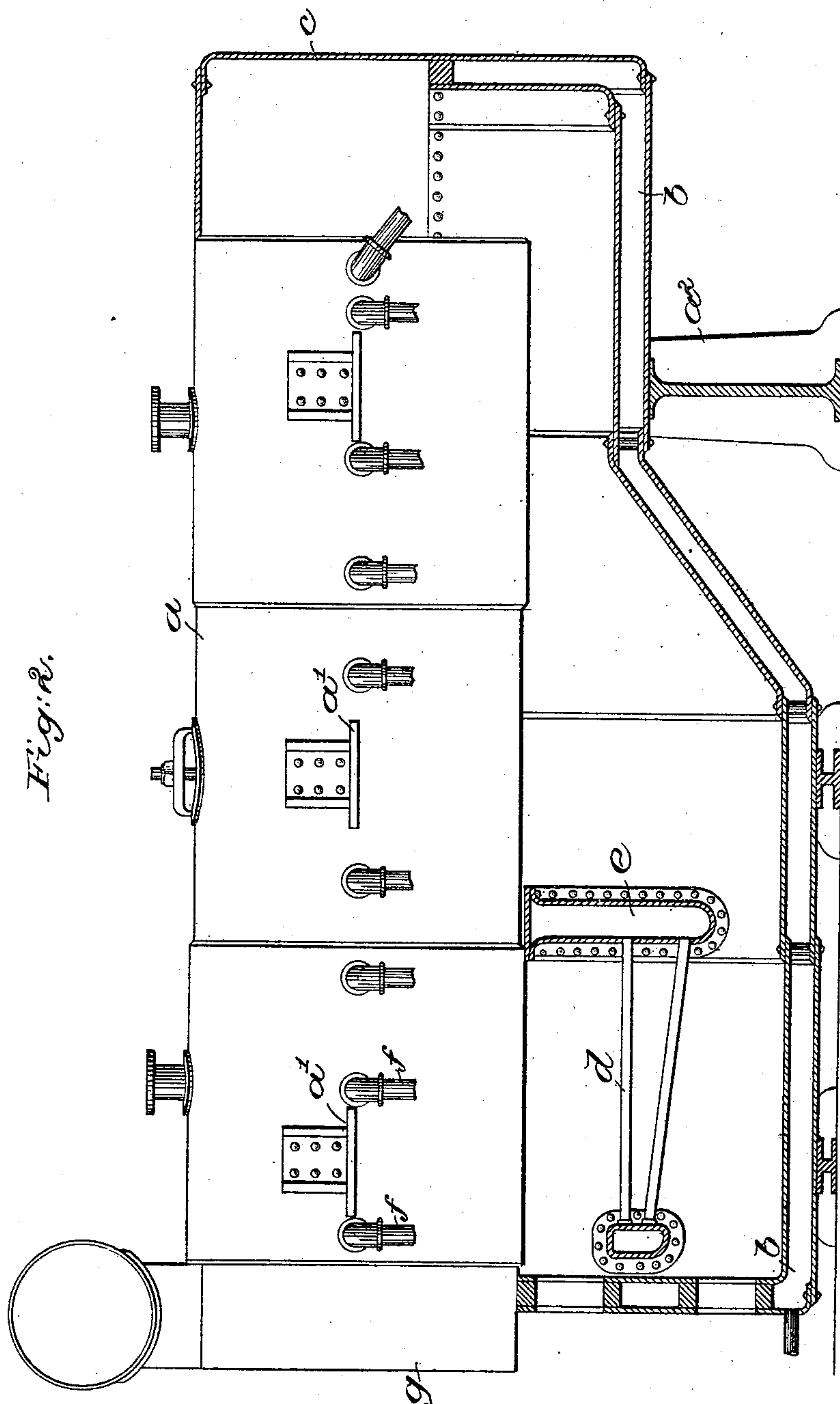
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Edgar A. Goddin

Inventor:
James F. Bliss.
by Lemby Gregory attys.

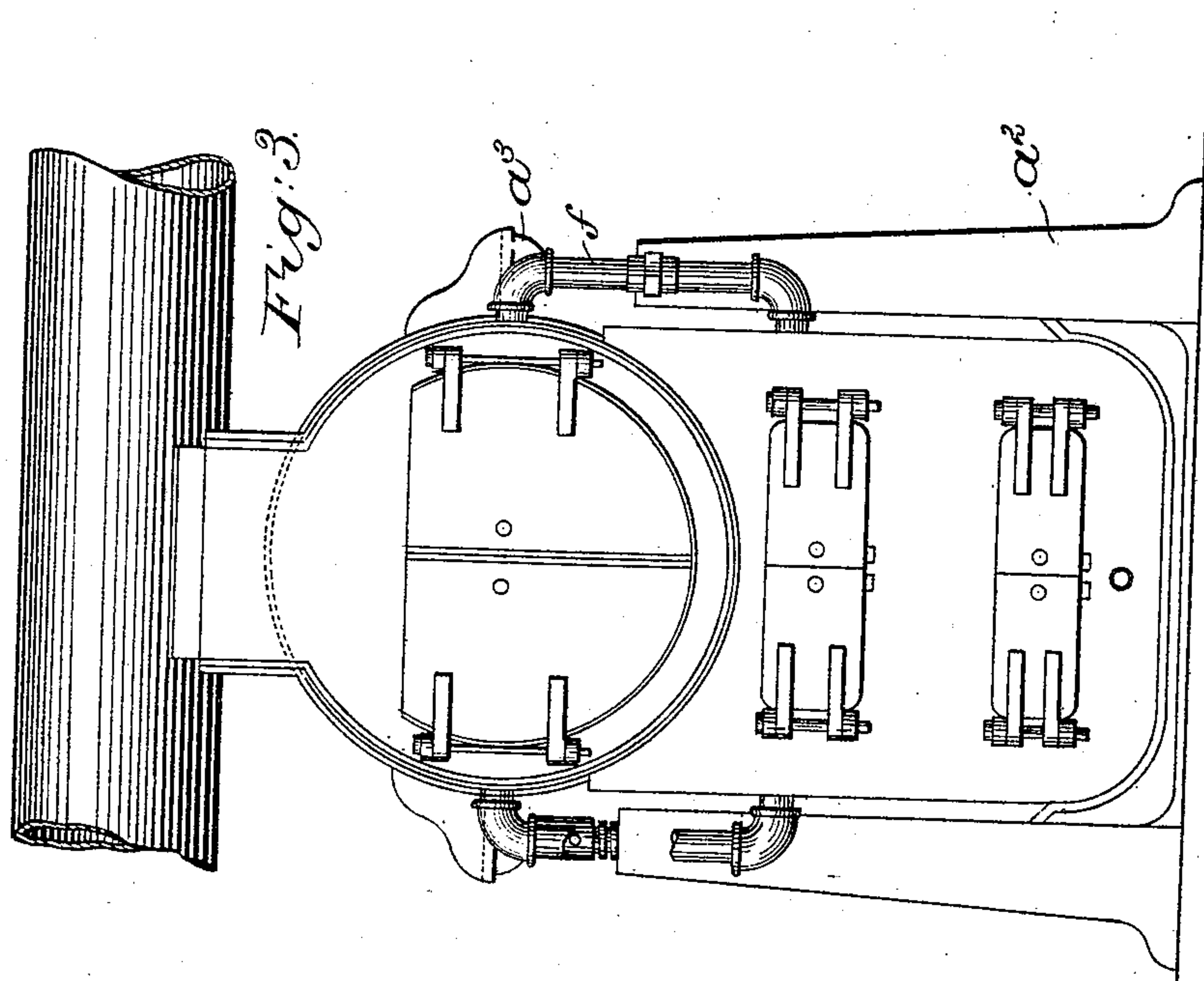
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Witnesses,

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UNITED STATES PATENT OFFICE.

JAMES F. BLISS, OF BOSTON, MASSACHUSETTS.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 459,435, dated September 15, 1891.

Application filed April 29, 1891. Serial No. 391,022. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. BLISS, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Boiler-Furnaces, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve the construction of boiler-furnaces for or in connection with return-flue boilers.

In accordance with this invention the boiler, having the usual return-flues, is supported on jacks, preferably in an adjustable manner. The water-jacket is placed beneath said boiler, being formed to contain within it a fire-box, ash-pit, and draft-chamber. The water-jacket is connected with the boiler by numerous pipes to obtain a proper circulation.

I have employed a water-grate and a water-leg back of it, and so far as the essential features of my invention are concerned said water-leg may be located directly beneath the boiler to leave a draft opening or passage below it, thereby insuring a downdraft; or it may rest on the water-jacket with an opening or passage above it, insuring an updraft. This water-jacket, containing a water-grate, water-leg back of it, ash-pit, and draft-chamber, and the pipes connecting said water-jacket with the boiler constitute the boiler-furnace.

Figure 1 shows in side elevation a boiler and furnace embodying this invention; Fig. 2, a longitudinal section of the boiler-furnace shown in Fig. 1 and in elevation the boiler; Fig. 3, a front elevation of the boiler and furnace shown in Fig. 1.

a represents a return-flue boiler of any usual or suitable construction. Upon each side of it ears or lugs *a'* are secured, which rest upon jacks (herein shown as composed of columns *a²*) and screw-rods *a³*, being thereby adjustable. Beneath said return-flue boiler *a* a water-jacket *b* is placed, it being shown as substantially rectangular in cross-section from the front rearwardly for about one-half its length and semicircular in cross-section the remaining distance. This water-jacket *b*

is extended some distance beyond the rear end of the boiler *a*, as best shown in Fig. 2, where it communicates with a suitable shell *c* on the rear end of said boiler. The water-jacket *b* at its forward end contains the water-grate *d* and the water-leg *e*, resting against the under side of the boiler *a*, thereby leaving an opening beneath it to insure a downdraft. The water-leg *c* is connected with the water-jacket to allow free passage of the water from side to side. Back of said water-leg *e* the water-jacket simply presents a draft flue or chamber, and the shell *c* also forms a draft flue or chamber, which incloses the entrance to the flues of the boiler *a*. Numerous short pipes, as *f*, connect the water-jacket with the boiler *a* at different points to establish and maintain a good circulation.

The fire is built on the water-grate *d* in usual manner, and the draft, passing down through the grate beneath the water-leg *e*, passes through the flue or chamber back of it, thence through the flues in the boiler *a*, and into the uptake *g* at the front of the boiler. The water contained in the water-jacket *b* becomes heated and, rising, passes through the pipes *f* into the boiler until the water contained in the boiler is of equal temperature. By means of this water-jacket I am enabled to generate steam much quicker, to make more steam, having a larger quantity of water, thereby materially increasing the working capacity of any ordinary return-flue boiler.

In practice I propose to remove the usual brick boiler-furnace from beneath a return-flue boiler and to substitute therefor the furnace herein shown and connect it with the boiler in the manner shown and described.

I claim—

1. The return-flue boiler *a*, combined with the water-jacket *b*, placed beneath it and shaped substantially as shown and described, and containing the water-grate *d* and water-leg *e*, and the connecting-pipes *f*, connecting the water-jacket *b* with the boiler *a* to establish and maintain a circulation of water, substantially as and for the purpose set forth.

2. The return-flue boiler *a* and adjustable jacks for supporting it, combined with the

water-jacket *b*, placed beneath it and shaped substantially as shown and described, and containing the water-grate *d*, and water-leg *e*, and short connecting-pipes *f*, connecting the
5 said water-jacket and boiler, substantially as and for the purpose set forth.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

JAMES F. BLISS.

Witnesses:

BERNICE J. NOYES,
EDWARD F. ALLEN.