

(No Model.)

2 Sheets—Sheet 1.

A. HOLT.

HEATER FOR STEAM AND WATER.

No. 291,347.

Patented Jan. 1, 1884.

Fig. 2

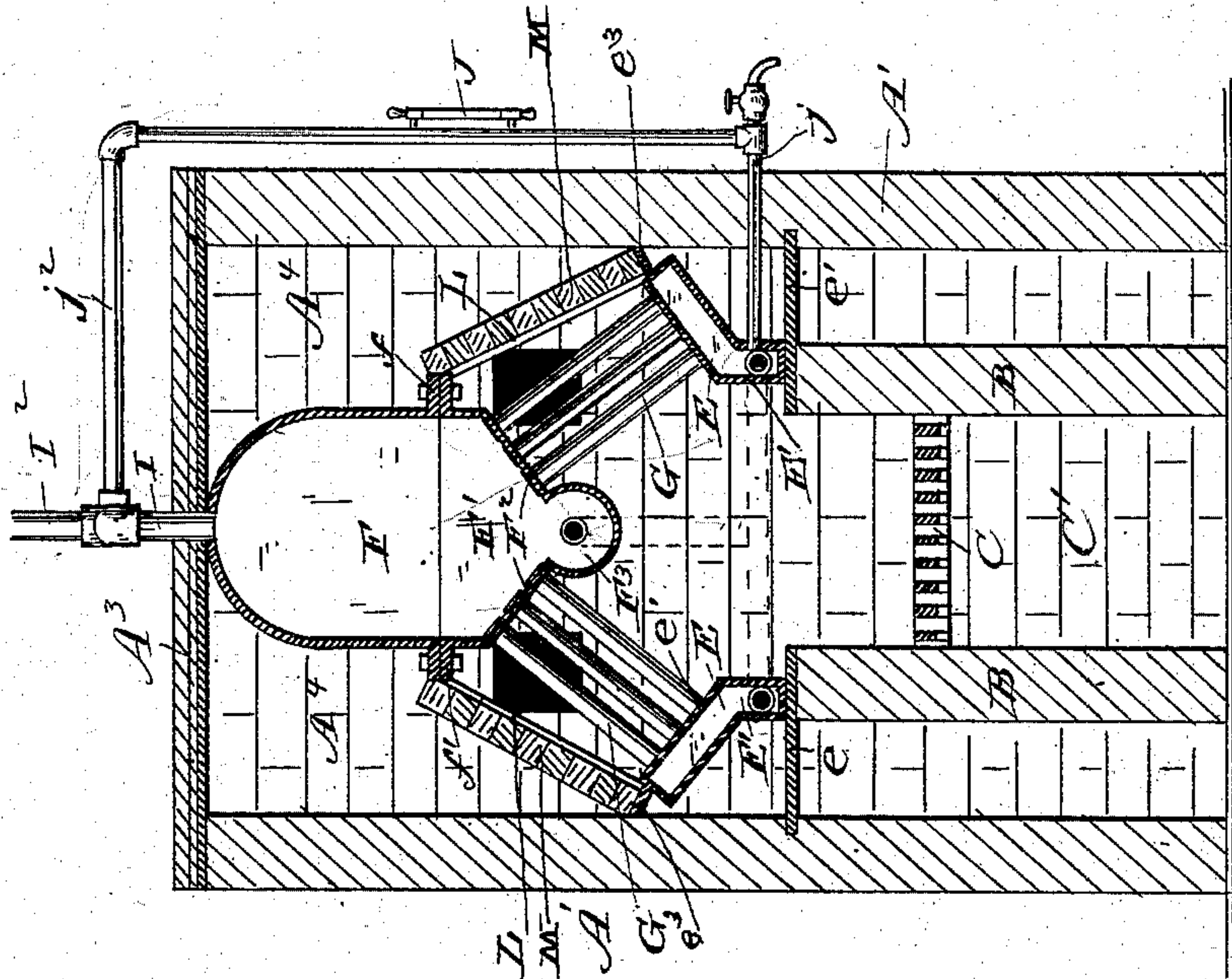
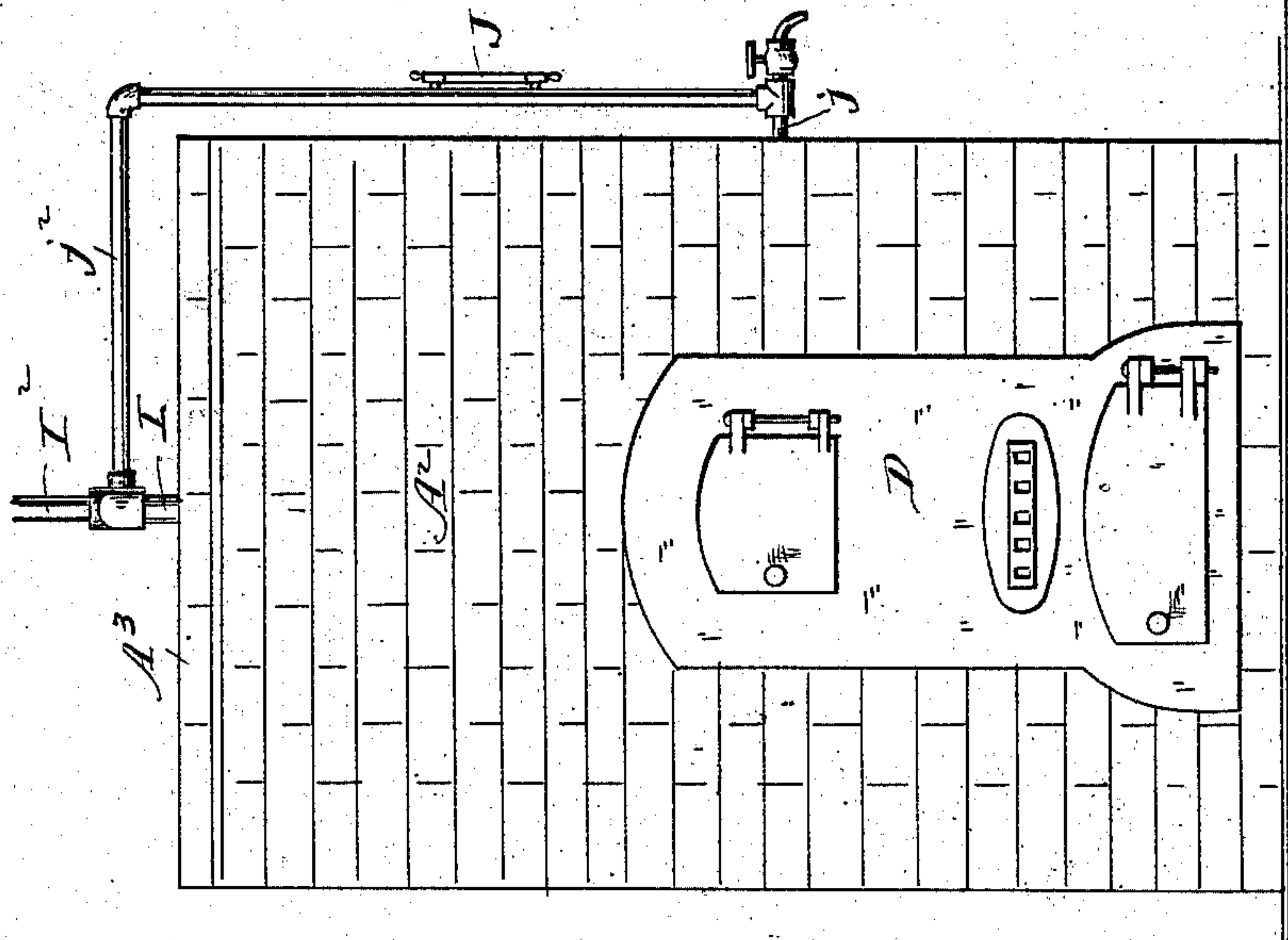


Fig. 1



Witnesses

H. A. Low
R. H. Sumner

Inventor

Alden Holt

by Doubleday & Bliss

(No Model.)

2 Sheets—Sheet 2.

A. HOLT.

HEATER FOR STEAM AND WATER.

No. 291,347.

Patented Jan. 1, 1884.

Fig. 2.

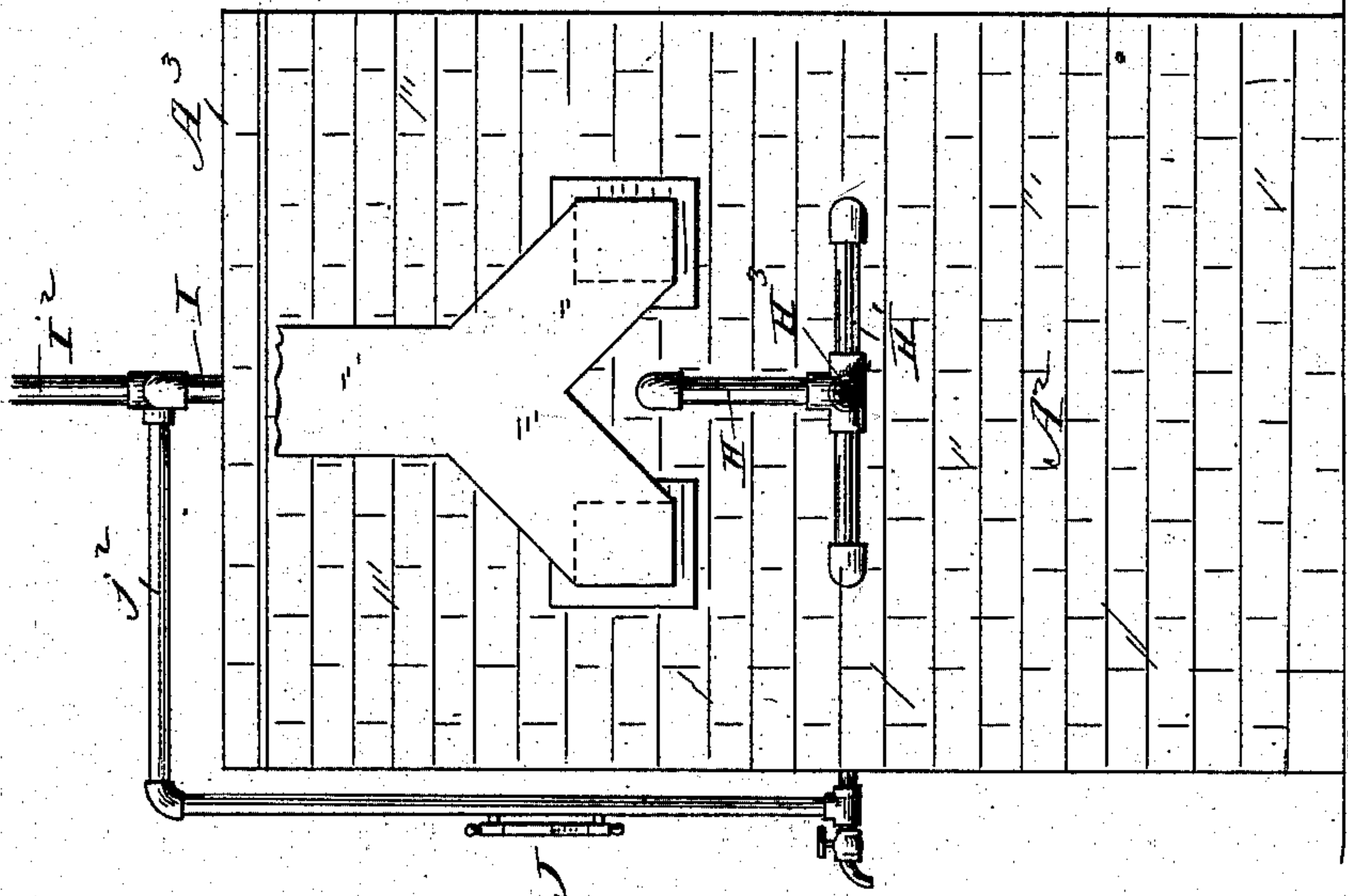
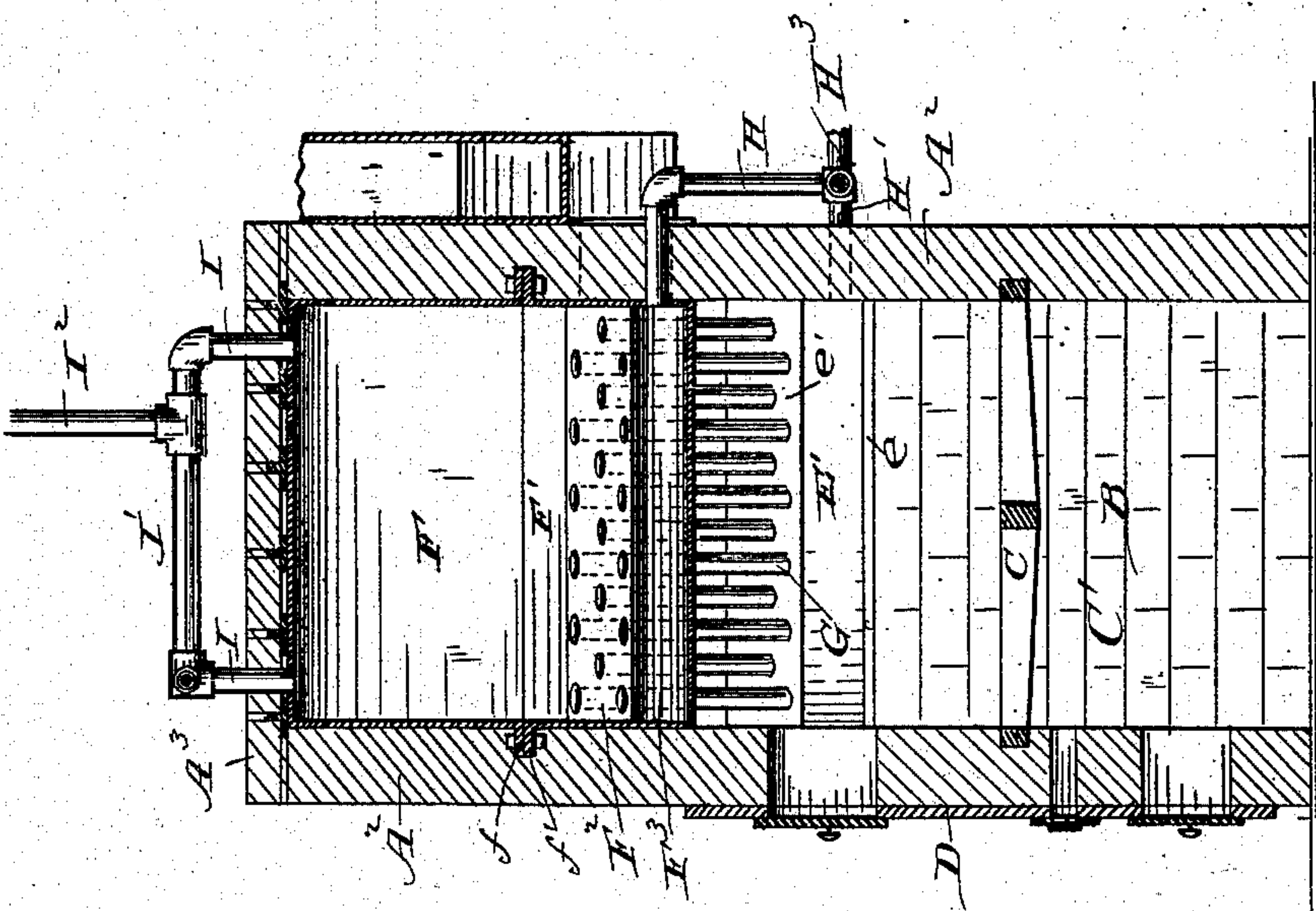


Fig. 3.



Witnesses

N. N. Low
P. W. Simmons

Inventor

Alden Holt
by Doubleday & Hissatt

UNITED STATES PATENT OFFICE.

ALDEN HOLT, OF BOSTON, MASSACHUSETTS.

HEATER FOR STEAM AND WATER.

SPECIFICATION forming part of Letters Patent No. 291,247, dated January 1, 1884.

Application filed August 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, ALDEN HOLT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Heaters for Steam and Water, of which the following is a specification, reference being therein to the accompanying drawings.

Figure 1 is a front elevation of an apparatus containing a heater embodying my improvements. Fig. 2 is a transverse section. Fig. 3 is a longitudinal section. Fig. 4 is a rear elevation.

In the drawings, A represents the chamber, in which is inclosed the furnace and boiler apparatus, said chamber being formed by means of brick-work, the walls of which are preferably constructed relatively to each other in the manner shown—that is to say, it is formed with vertical side walls, A' A', end walls, A² A², and a top, A³.

Inside of the side walls, A', there are supplemental low walls B B, of brick-work, for the purpose of supporting the grate and other parts of the fire-box proper, and also supporting other parts, to be hereinafter described.

The fire-box or furnace proper may be constructed in any suitable way, though I prefer that shown—that is to say, at C there is a grate, below which a chamber, C', is left to receive the ashes. In the front wall of the chamber there is an iron plate, D, for supporting the doors, this plate and the doors being of any suitable or preferred construction.

The apparatus in which the water is heated and the steam is generated is constructed and supported as follows:

E E represent angular water-boxes, one of which is arranged upon each side of the furnace. Each of these is formed with a downwardly-projecting or vertically-arranged part, E', and an outwardly and upwardly inclined part, E, both being cast in one piece. The part E' rests upon the wall B or upon pieces of fire-brick, e, interposed between said part E and said wall. The part E of the water-box is provided with a number of threaded apertures in the upper wall, e', adapted to receive the lower ends of the water-tubes.

The upper part of the heater consists of a dome portion, preferably about semi-cylindrical in shape, as represented at F, and a lower

water-holding portion, F'. The upper and the lower parts, F and F', are united by means of flanges f and f', one carried by the upper and the other by the lower part, there being bolts which secure the flanges firmly together to form a water-tight and steam-tight joint. The lower part, F', has inclined walls F² F², which are parallel to the upper walls, e' e', of the water-boxes E E'. These inclined walls F² F² are provided with apertures, in which fit the upper ends of the water-pipes. These latter are represented by G G, being screw-threaded at their lower ends to fit the apertures E E', which are also threaded, and at the upper ends the tubes are expanded within and above the apertures in the plates F², so that a water-tight and steam-tight joint is produced. By securing the parts of the heater together in this way, I can make it much more easily, and therefore it is much cheaper than when the parts are fitted together in the ways heretofore employed. It will be seen that access can be readily had to the interior of the upper receptacle, for when the parts thereof are separated a large opening is given to the lower part, so that tools and implements can be easily introduced for expanding the upper ends of the inclined tubes. Any suitable number of these heating-tubes G may be used, though for ordinary purposes it will be found that three rows on each side of the furnace are sufficient, those of the middle row being arranged to alternate with those of the inner and the outer rows. The portion F' of the heater is at the lower part formed with a downwardly-extended drum, F³, preferably of about the character shown—that is to say, semicircular in section on the under side, and with inwardly-extended walls f³ f³.

In order to cut off the upper portion of the upper receptacle from the influence both of the external air and of the products of combustion, I form upon the sides thereof dead-air chambers, these being produced by means of walls of non-conducting material—such as bricks M—supported upon metallic plates L, which, in turn, at their upper end are supported against the upper receptacles, and at their lower ends are supported upon flanges e³, cast with their lower receptacles, E E'. These walls separate the space within the casing into three compartments, two of which

are filled with dead air. At the rear ends the water-boxes E E' are united with the water-drum F³, above described, by means of a tubular connection, which is shown in the drawings to consist of tubes H H', the tube H communicating with the drum F³ and with the tube H', which latter at the end communicates with the boxes E E'. The water may be introduced in any suitable way to the interior of the heater, as by pipe H³, and the steam may be conducted away therefrom in any preferred way. In the drawings I have shown the steam as passing out of the dome part F at each end through pipes or tubes I, which communicate with the tubes I' I², that go to the radiator, or to whatever point it is desired to conduct them to. With these parts may be combined a gage, as shown at J, the tube which supplies the gage connecting with the water-box E E' by a branch tube, j, and communicating also with the steam-passage by means of a top branch tube, j².

I am aware of the fact that use has been heretofore made of two sets of inclined tubes arranged to converge upwardly, they having been employed in combination with boilers and heating apparatus of various styles, and I do not broadly claim heating-tubes so arranged as my invention; but a construction of the character of mine possesses many advantages over those which have been heretofore in use, especially for the purpose for which my construction is mainly intended—to wit, the providing of heat for buildings by means of steam—and in most cases but little room is available, and the heater must be furnished at the lowest possible cost. The constructions heretofore in use have been of such nature as to occupy much room, and as to necessitate considerable expense. Thus in one form of steam-generator heretofore employed use has been made of two sets of inclined tubes, at the upper ends united to a series of separate pipes or tubes, each provided with tubular inclined extensions to respectively receive the upper end of one of the inclined tubes, and at the lower ends united to two rows of inclined pipes or tubes, each situated at an angle to the horizon, and having tubular extensions to respectively fit the end of one of the inclined tubes. A construction of the sort last described is far more difficult to make and more expensive than mine. By casting the chamber F F' in substantially the manner shown—that is to say, so that it shall be not properly a tube, but a comparatively large metal compartment, having the inclined walls F² F² extending from end to end, and by having each of the lower receptacles, E E', in substantially the form shown—that is to say, with a bottom supporting-leg, E', and an upper inclined chamber, E, with walls parallel to the walls F²—the parts of the furnace can be made and united with much less trouble and labor, and the water will be held in such way as to allow a uniform circulation and distribution, and at the same time the mass of it

shall be exposed to a large extent of heating-surface.

A steam-generator of another style has been known, having round water-receptacles at the bottom, two sets of inclined tubes, and at the top two separate round tubes, each communicating from end to end with one of the series of inclined tubes. My heater is, however, more advantageous for the purposes for which it is intended than are those of this last-mentioned character, as the tubes cannot be secured at their upper and lower ends to receptacles which are circular in cross-section as readily and cheaply as they can be secured to the cast boxes which I have shown and described.

By threading one end of each tube and securing said end in the lower box, the attachment can be readily effected, and by having the upper receptacle formed in two parts (which can be separated and leave a large opening for the lower part) access can be readily had to the upper end of each tube for the purpose of expanding it and producing a tight joint; but when the receptacles are so constructed that there is not easy access to the interior, it is difficult to securely join the ends of the tubes to the receptacles.

What I claim is—

1. In a heater for steam or water, the combination of an upper receptacle for water and steam, having the steam-dome portion F and the lower portion, F', cast with downwardly-converging plates or walls F², having longitudinal series of tube-apertures, said portions F and F' being cast separately and bolted together, the lower receptacles, E E', each having the tight lower portion, E', cast integrally with the part E, both extending from one end to the other of the heater, and each part E having a wall or plate, e', parallel with one of the walls F', and the tubes G, having their ends secured in said parallel plates or walls, substantially as set forth.

2. In a heater for steam or water, the combination of the upper receptacle, F F', two sets of inclined downwardly-converging steam-tubes, both sets communicating with said receptacle F F', the receptacles E E' at lower points, each connecting all of the tubes of one set, the outer masonry casing around the heater, the smoke-flue communicating with the heating-chamber at or near the upper horizontal plane of the heating-tubes, and the interior supplemental masonry walls, M, above the smoke-flue, and extending from the upper receptacle, F F', to the lower receptacles, respectively, whereby the products of combustion are prevented from rising above said tubes, and dead-air chambers are formed around the upper portion of the heater, substantially as set forth.

3. The combination of the lower receptacles, E E', having the flat upwardly-inclined plates e' extending from end to end of the heater, the inclined tubes G, fitting into the receptacles E, and the upper receptacle for

water and steam, having the lower part, F',
cast with the walls F², inclined to be parallel
with the walls e', and the steam-dome F, cast
separately from and bolted to the lower part
5 F', substantially as described and shown, and
the outer casing which surrounds the aforesaid
parts, substantially as set forth.

4. The combination of the upper receptacle
for steam and water, the lower receptacles, E
10 E', each having an upwardly-extended flange,
e³, inclined tubes arranged in two upwardly-

converging sets, and the bricks or masonry M,
resting at the bottom on the flanges e³ and at
the top against the upper receptacle, substan-
tially as set forth.

In testimony whereof I affix my signature in
presence of two witnesses.

15

ALDEN HOLT.

Witnesses:

GEO. H. KINGSBURY,
S. SANBORN.