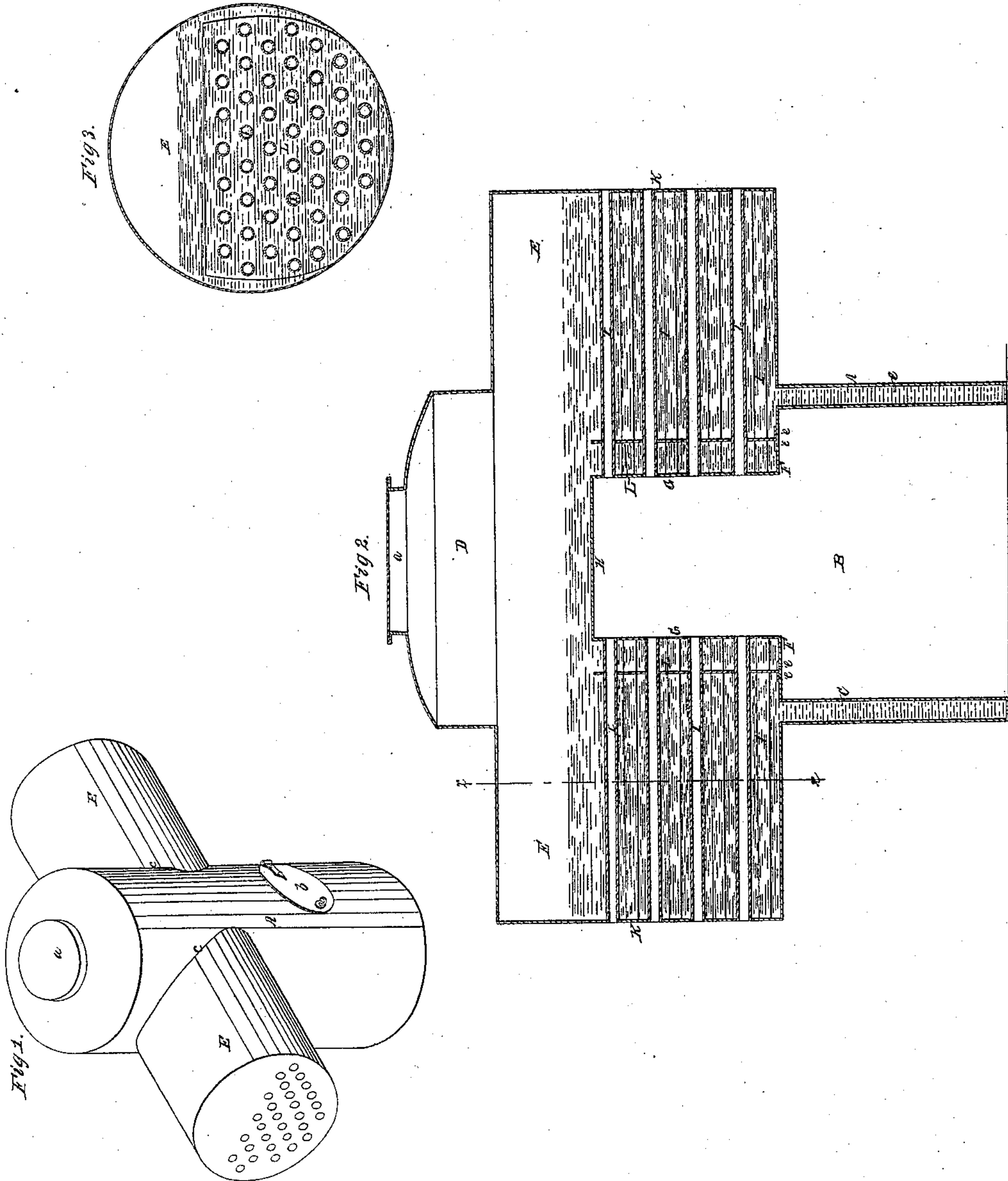


B. F. Campbell,
Steam-Boiler Fire-Tube.

N^o 30,957.

Patented Dec. 18, 1860.



Witnesses.

Thos. R. Roach
Thos. H. Glover

Inventor
B. F. Campbell

UNITED STATES PATENT OFFICE.

BENJAMIN F. CAMPBELL, OF ROXBURY, MASSACHUSETTS.

IMPROVED STEAM-BOILER.

Specification forming part of Letters Patent No. 30,957, dated December 18, 1860.

To all whom it may concern:

Be it known that I, BENJAMIN F. CAMPBELL, of Roxbury, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Steam-Boilers for Locomotives and other Purposes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a view of my improved boiler; Fig. 2, a longitudinal vertical section; Fig. 3, a transverse vertical section on the line *xx* of Fig. 2.

The object of my present invention is to produce a steam-boiler having a large amount of heating-surface in a compact form, and which shall produce a good combustion of the fuel, thus rendering it economical in its operation; and my invention consists in a steam-boiler, from the body of which projects laterally wings containing series of fire-tubes communicating with the fire-box and with a smoke-stack.

That others skilled in the art may understand and use my invention, I will proceed to describe the manner in which I have carried out the same.

In the said drawings, A is the vertical body of the boiler, the lower part of which contains the grate and fire-box B, which is surrounded with a water-space, C. The upper part of this body forms a steam-dome, D, to which access may be had for repairs, &c., through a man-hole, *a*, on top. (The steam-pipes, valves, &c., not essential to the understanding of my invention, are not shown on these drawings.) A door, *b*, gives access to the fire-box B. From opposite sides of the body A of the boiler project wings E, which are circular in their cross-section, as shown in Fig. 3, and are connected to the circular body A at *c*. A crown-sheet, F, projects inward into the fire-space B on each side, and from it rises a tube-sheet, G, which is attached to another crown-sheet, H, over the center of the fire-box B. The tubes I are secured at their inner ends in the tube-sheets G, and at their other ends in the heads K of each of the wings E. As the space between the two tube-sheets G is considerably less than the diameter of the lower part of the fire-box B, the strain which would be put upon the crown-sheet by the heat of the fire, if in one plain

surface, is divided, the crown-sheets F being bridged by the tube-sheets G, while the crown-sheet H, which is comparatively narrow, may be braced from the top of the dome D. In order, however, to give additional support to the crown-sheets F, I place over each a bridge, L, which is a heavy plate or sheet of iron perforated with holes through which the tubes I pass, the holes being large enough for the water to circulate around the tubes. The lower edge of this plate L is slit up a short distance at intervals, and the alternate portions of the plate are bent toward opposite sides, forming feet *e*, which are riveted to the top of the crown-sheet.

This construction of bridge I find possesses great strength, while it allows me to place the lower row of tubes I close down to the crown-sheet F. The water-space C around the fire-box communicates with the water-space around the tubes I in each wing E, and these latter spaces open directly into the dome D, the water-level being maintained a little above the crown-sheet H. The heads K of the wings E are each intended to form one side of a smoke-box, into which the cylinder exhausts. These smoke-boxes may each have a separate smoke-stack; or a flue from each may enter a single smoke-stack, as may be found most convenient. The boiler here represented possesses the advantages of compactness, cheapness of construction, and great strength. The weight may be equally balanced on each side of the fire-box, and its combustion of fuel is found to be very perfect.

I am aware of steam-boilers having been constructed with the tubes and tube-sheet projected from one side of the fire over the grate, as in the boiler upon which Letters Patent were granted to C. F. Thomas, June 19, 1855. I therefore disclaim the projection of the tube and tube-sheet over the fire; but

What I do claim as of my invention is—

1. The combined arrangement of two wings, E, containing the tubes I, with a single fire-box, when the said wings project equally from either side of the fire-chamber over the grate, as and for the purposes hereinbefore set forth.

2. The perforated plate L for bridging the crown-sheet F, substantially as set forth.

B. F. CAMPBELL.

Witnesses:

THOS. R. ROACH,
THOS. D. GLOVER.