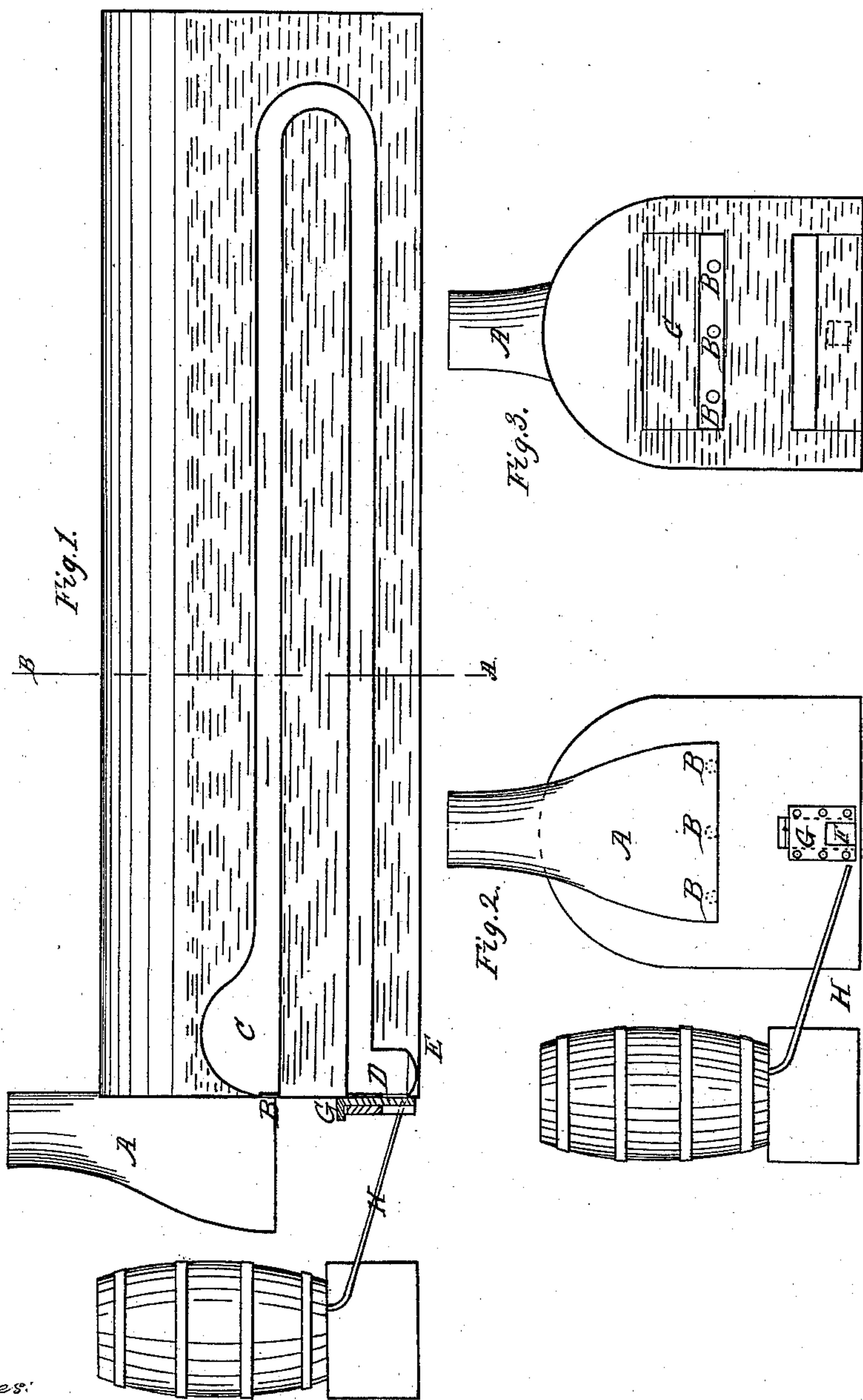


Budd & Husband, Steam-Boiler Fire-Box.

N^o 43,476.

Patented July 12, 1864.



Witnesses:

Wm. A. Husband
J. H. Butter

Inventor:

William Budd
J. L. Husband

UNITED STATES PATENT OFFICE.

WILLIAM BUDD AND J. L. HUSBAND, OF PHILADELPHIA, PA.

IMPROVED STEAM-BOILER.

Specification forming part of Letters Patent No. 43,476, dated July 12, 1864.

To all whom it may concern:

Be it known that we, WILLIAM BUDD and J. L. HUSBAND, of the city of Philadelphia, in the State of Pennsylvania, have invented a new and improved mode of constructing steam-boilers adapted to oils (coal oil, for instance) as a fuel, so as to control the fire and augment the heat thereof, and burn most of the smoke; 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 drawings, making part of this specification, in which—

Figure 1 is a longitudinal view, Fig. 2 a front view, and Fig. 3 a through sectional view as per line A B in Fig. 1.

The letter A in said figures is a view of a section of the smoke-pipe and its bonnet-base. Letter B in same figures is a view of and indications where the ricket-ports should be placed or made. Letter C in Fig. 1 is a view of the counter-draft combustion-chamber. Letter E in same figure is a view of the concave bottom of an air-tight fire-chamber indicated by the letter D. Letter F is a view of the draft-hole in fire-chamber. Letter G is a view of the check-draft door to the fire-chamber. Letter H is a view of the oil-fuel feed-pipe.

The arrows indicate the flames as extending from the fire-chamber to the counter-draft combustion-chamber, where they are met by a current of air, (further,) indicated by arrows as passing under the smoke-pipe's bonnet, through the ricket-ports into the counter-draft combustion-chamber to do its work—*i. e.*, burn the unconsumed gas and smoke from the fire-chamber. The oil-fuel barrel may be fixed in any place so it be connected with the feed-pipe. The flow of oil must be regulated at the barrel. When the oil is ignited in the fire-chamber, the current of air through the draft-hole should, if possible, be regulated by the check-draft door thereof, so as to have the atmospheric air pressure through the fire-chambers, draft-hole, and through the counter-draft combustion-chamber ricket-ports equipollent. In a return-flue boiler of, say for instance, ten

feet long, three feet wide, and three and one-half feet high to the apex of the semicircular top, the flues of such proportioned boiler should be, for instance, three inches high and twenty-four inches wide, and have a draft area of seventy-two square inches. The bottom line of the first flue should be, for instance, nine inches from the boiler-bottom. The fire-chamber should be of the width of the flue and form the upper line thereof, and have an area of two thousand six hundred and twenty-six square inches, cubic inches, not square. These should be nine inches in height between the flue and return-flue, the end of which must be enlarged to form the counter-draft combustion-chamber. This chamber in such sized and shaped boiler should be eighteen inches high from the bottom line of the return-flue, and have, for instance, an elliptical lengthwise and a cubical area of nine thousand one hundred and eighty-four cubic inches. There should be, for instance, three ricket-ports of a circular form, each having an area of ten square inches and rest on the bottom line of said chamber, and be lined with tempered clay. The bonnet of the smoke-pipe for such sized flues, counter-draft combustion-chamber, and ricket-ports should, for instance, at the apex of the radius of the semicircular base line thereof, stand from the front of the boiler's face some thirty inches, and be of a conical convex form from the lower line of the ricket-ports to the apex of the boiler, from which the smoke-pipe may be of the usual size and form.

What we claim as our invention, and desire to secure by Letters Patent, is—

The counter-draft combustion-chamber, ricket-ports, or any opening in the nature thereof—as counter-draft air-holes to such chamber—and the bonnet-base smoke-pipe to form a counter draft combustion-chamber, as hereinbefore more fully set forth.

WILLIAM BUDD.
J. L. HUSBAND.

Witnesses:

WM. A. HUSBAND,
H. TUNIJAR.