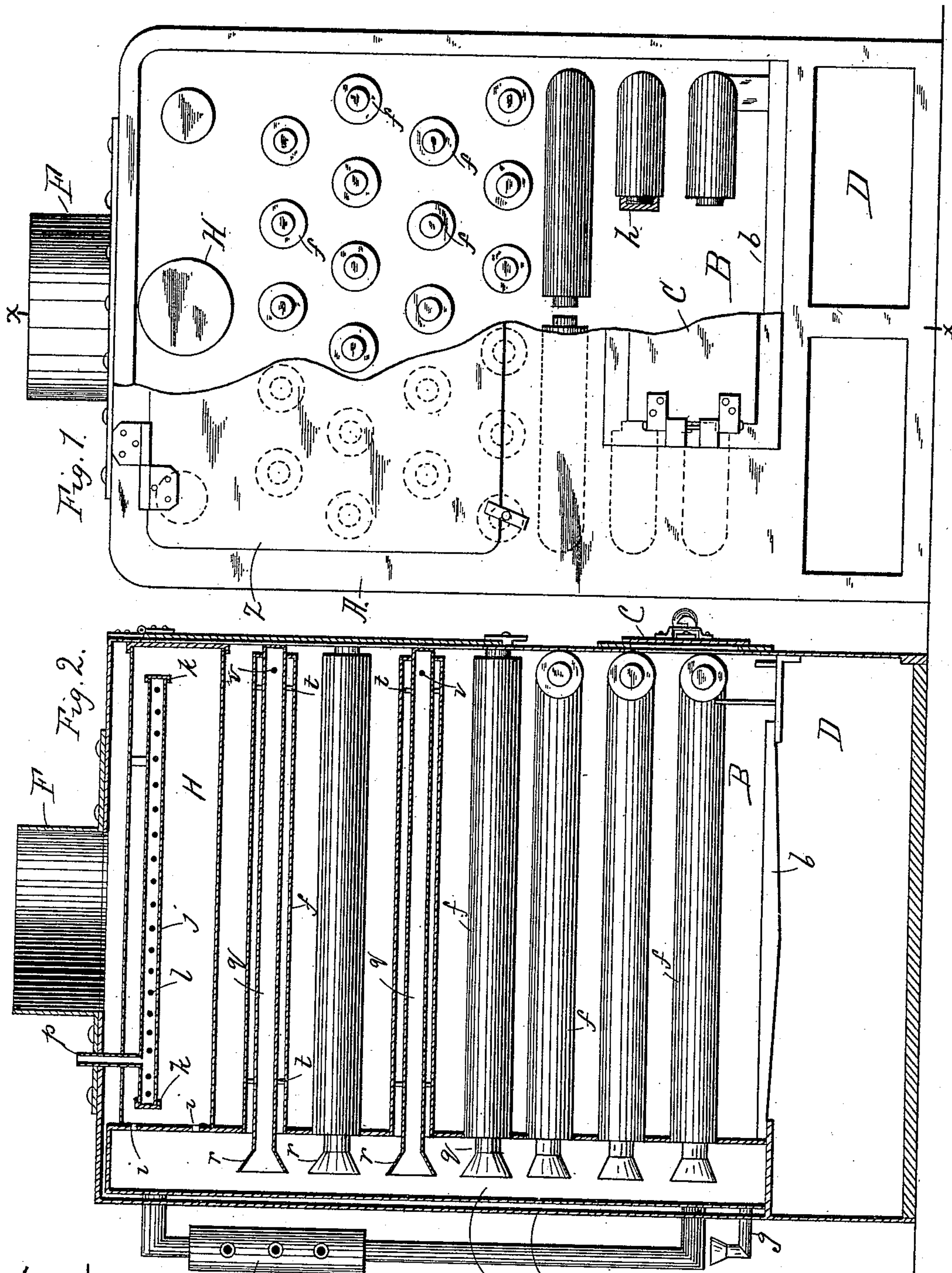


(No Model.)

F. W. COOMBS.
STEAM BOILER.

No. 464,556.

Patented Dec. 8, 1891.



WITNESSES

M. J. Egan
W. B. Dwyer

INVENTOR

Frederick W. Coombs
By *C. A. Shaw*
ATTYS

UNITED STATES PATENT OFFICE.

FREDERICK W. COOMBS, OF ISLESBOROUGH, MAINE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 464,556, dated December 8, 1891.

Application filed May 19, 1891. Serial No. 393,256. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. COOMBS, of Islesborough, in the county of Waldo, State of Maine, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of my improved boiler, a portion of the casing being broken away to show the tubes; and Fig. 2, a vertical longitudinal section of the same, taken on line *x x* in Fig. 1.

Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates especially to steam-boilers which are provided with priming water-tubes; and it consists in certain novel features hereinafter fully set forth and claimed, the object being to produce a simpler, cheaper, and more effective device of this character than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation:

In the drawings, A represents the casing, which may be of any suitable form, and is provided in its lower portion with a fire-box B, to which a door C in the front wall of the casing leads. A grating *b* is disposed over the ash-pit D. A series of water-tubes *f* are arranged longitudinally within the casing above the fire-box, and at the rear of said body or casing there is a water-chest E, into which a supply *g* opens near its bottom. The tubes *f* open through the inner wall of the water-chest E, the opposite ends of said tubes being closed by a cap or other suitable means. A chimney or draft-tube F opens centrally through the top of the case, and directly below said tube there is a superheating-drum H. Small ports *i* lead from the chest into said drum. A horizontally-arranged tube *j*, closed at its ends by caps *k*, is disposed within the drum and is provided with a series of perforations *l*. Said tube is pendent from the upper wall of the drum, and from one end

thereof a discharge-port *p* leads vertically upward through the top of the boiler-casing. Within each tube *f* a priming-tube *q* is disposed, the outer ends of said tubes being closed and their opposite ends projecting from the tubes *f* into the chest E, where they are provided with flaring mouths *r*. It will be observed that the ends of the priming-tubes which project into the water-chest are conical or flaring, the purpose of which is to facilitate the entrance of the water into such tubes as well also as to prevent the direct return of water flowing out of the outer tubes. The flaring ends of said priming-tubes serve to disperse and distribute the water flowing out of the outer tubes. Pins *t* secure the priming-tubes within the water-tubes. The lower tubes *f* are extended around by an elbow to project in front of the fire-box, as shown in Fig. 1. A gage P opens into the chest E.

Water is pumped through the supply *g* into the chest and passes therethrough into all of the tubes *f* and priming-tubes *q* through their flaring mouths *r*. The inner ends of said priming-tubes have an opening *v*, which leads into the inner end of each tube *f*. Water passing through the priming-tubes circulate, through the openings *v* and back into the water-chest. The tubes being disposed directly over the fire-box the heat and products of combustion strike directly onto the tubes in passing out the chimney or draft F. The water, after circulating in the tubes *f*, passes back to the chest E. The steam generated passes through the ports *i* into the superheating-drum H, receives the full force of the heat as it passes through the flue F, said drum being disposed directly under said flue. The steam is withdrawn through the discharge-pipe *p*. The perforated pipe *j*, into which said port leads, serves to equalize the pressure in the discharge.

In the front wall of the casing a hinged lid *z* is mounted, said lid being located by any suitable means whereby the circulation-tubes and their ports within the boiler may be readily reached.

Having thus explained my invention, what I claim is—

In a steam-boiler, a casing provided with a fire-box, a chimney mounted vertically over said fire-box, a water-chest in the rear of said

casing, a series of circulation-tubes leading from said chest horizontally over said fire-box, a superheating-drum disposed in line with said chimney and provided with two ports
5 opening directly into the top of said water-chest, and a perforated pipe located in said superheating-drum and provided with a discharge-port, the fire-box, the circulation-tubes, the water-chest, and the superheating-drum being all inclosed by the said casing, substantially as shown and described.

FREDERICK W. COOMBS.

Witnesses:

JEREMIAH L. BROWN,
JOHN P. ROBERTS.