

C. M. OLSEN.
STEAM BOILER.

APPLICATION FILED DEC. 27, 1909.

Patented Oct. 25, 1910.

2 SHEETS-SHEET 1.

973,692.

Fig. 1

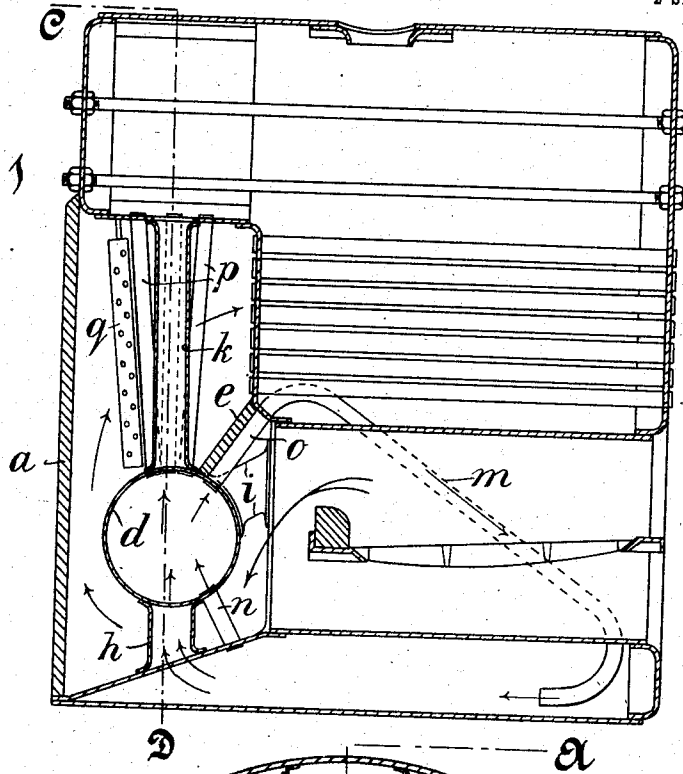
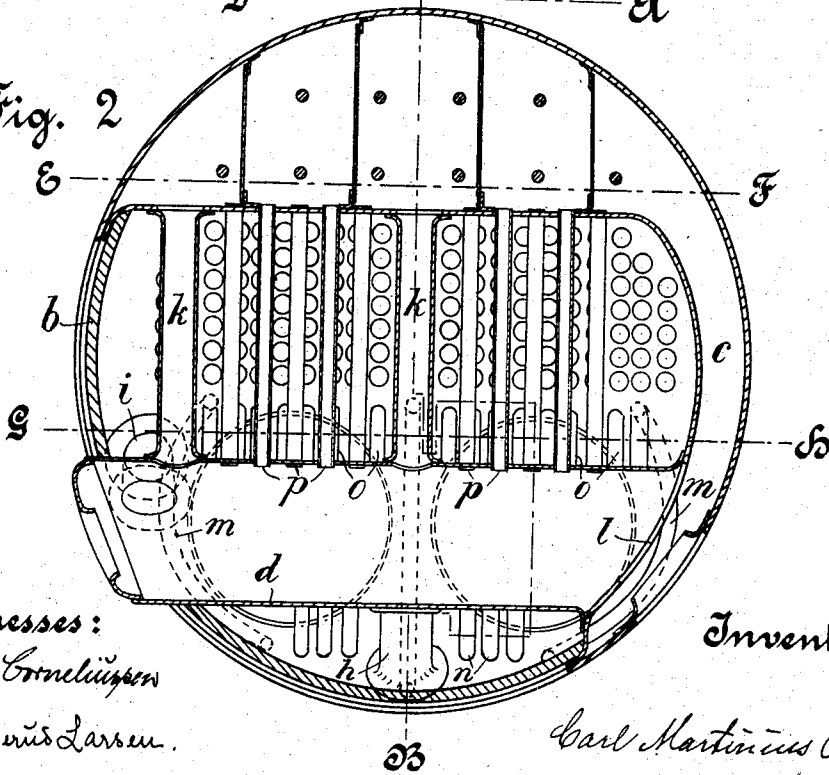


Fig. 2



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2 SHEETS—SHEET 2.

Fig. 3

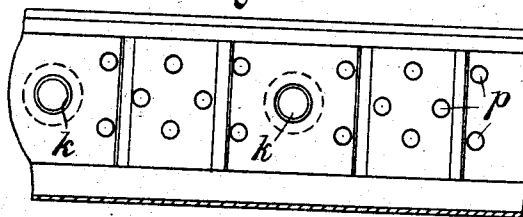


Fig. 4

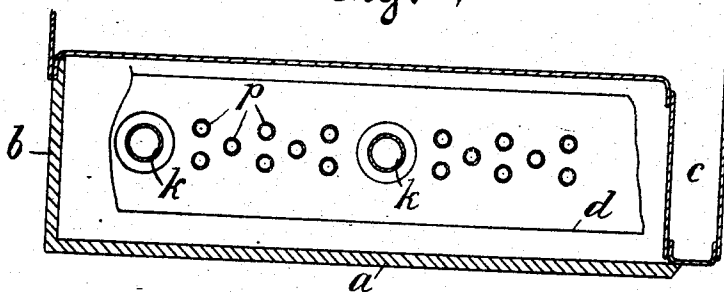
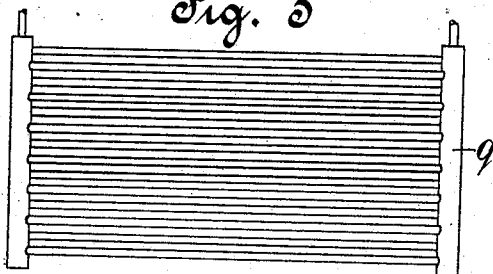


Fig. 5



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UNITED STATES PATENT OFFICE.

CARL MARTINIUS OLSEN, OF BIRKERÖD, NEAR SANDEFJORD, NORWAY.

STEAM-BOILER.

973,692.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed December 27, 1909. Serial No. 535,031.

To all whom it may concern:

Be it known that I, CARL MARTINIUS OLSEN, a subject of the King of Norway, residing at Birkerød, near Sandefjord, in the Kingdom of Norway, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

The present invention relates to improvements in horizontal, multitubular steam boilers of the ordinary Scotch or any similar type having one or more furnaces, single or double-ended, and having a combustion chamber within the boiler partly surrounded by dry walls and fitted with a cross-cylinder and with water tubes which connect the cylinder with the boiler, the cylinder being also in communication with the lower front part of the boiler so as to circulate the water in parts which are little or not at all exposed to the heat of the furnace.

The improvements consist essentially in the arrangement of the cross-cylinder and the water tubes as hereinafter described, the cylinder being of comparatively large dimensions and elevated to a position behind the furnace flues where it is directly exposed to the heat. The cylinder is further connected to the boiler by means of a partition wall which compels the hot flue gases to pursue a circuitous route around the cylinder and across the water tubes which radiate from the same toward the top, the bottom and the back of the boiler. The tubes connecting the cylinder with the lower front part of the boiler are carried from under the partition wall downward in a curve past the furnace flues and terminate in a rearward bend. A superheater may also be arranged in the combustion chamber.

Apart from the accelerated circulation of the water effected by the improved arrangement, a considerable increase in the heating surface and thereby a better utilization of the heat, are obtained.

In the annexed drawing the invention is illustrated, Figure 1 representing a longitudinal section of the boiler, along line A—B of Fig. 2, Fig. 2, a section through the combustion chamber along line C—D of Fig. 1, Fig. 3, a top view of the roof of the combustion chamber, taken in section along line E—F of Fig. 2, Fig. 4, a top view of the combustion chamber, taken along line G—H of Fig. 2, and Fig. 5, a side view of

the superheater which is shown in cross-section in Fig. 1.

The drawing represents a marine boiler of the Scotch type having the usual arrangement of fire-tubes. The arrangement of the latter, however, is of no importance as far as the carrying out of this invention is concerned.

The rear wall *a* of the combustion chamber is made of fire-proof material and preferably inclosed in a lining of sheet-iron. The side-walls may be constructed in the same manner, so as to avoid entirely the employment of wet walls with stay-bolts around the combustion chamber, or, as shown in the drawing, one side wall *b* may be constructed like the rear wall and the other *c* may have the usual construction. A cross-cylinder *d* is carried in horizontal position through the combustion chamber and, if the wall *c* is water-filled, connected to the same with one end so as to be in communication with the main boiler through the opening *l* in said wall. At the dry side of the chamber communication is established between the cylinder and the main boiler by means of a pipe *i*; such pipes are arranged at both sides if both walls are dry. The cylinder *d* also communicates with the top of the boiler by means of the vertical pipes *k* and a number of smaller tubes *p* which are radiating from the cylinder upward. In the same manner a vertical pipe *h* and a row of slanting tubes *n* connect the cylinder with the bottom of the boiler. Another row of tubes *o* connect the cylinder with the front wall of the combustion chamber, and these latter tubes are covered by a wall *e* of fire-brick which serves to conduct the heated flue-gases from the furnaces in a circle around the cylinder *d*, as indicated by the arrows. Each of the two tubes *o* which are at the extremities of the row, is continued through the boiler and carried in an outward curve *m* around the furnace flue to the front of the boiler where it terminates in a rearward bend under the flue. The tube in the center of the row is continued in the same manner between the two furnace flues. The heated water rising from the cylinder *d* into said tubes will thus be conducted to the part of the boiler which is least exposed to the heat and in which, ordinarily, hardly any circulation of the water takes place at all. Water will also be drawn from

the bottom of the boiler through the pipes *h* and *n*, as the heated water rises through the pipes *h* and *p*, and, since the cylinder *d*, and the tubes connected therewith, are directly exposed to the heat of the furnaces, this circulation will begin from the very commencement of the firing.

The described arrangement increases the heating surface of the boiler by about 10 to 15%, and it has therefore great economical advantages. Sufficient room is left in the combustion chamber for a superheater *g* to be arranged in the same (Figs. 1 and 5), whereby the heating surface is still more increased. In large boilers, with high combustion chamber, it may be advisable to employ more than one cross cylinder.

The improved arrangement can easily be adopted for any old Scotch boiler, particularly in case an extensive repair, for instance a renewal of interior parts, is contemplated.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a horizontal multitubular steam boiler, of the character described, a cross-cylinder arranged in elevated position in the combustion chamber so as to be directly exposed to the heat emitted from the furnace flues, water tubes radiating from said cylinder toward the top, the bottom and the back of the boiler, means for guiding the heated flue gases around the cylinder and across the water tubes, and means for conducting heated water from the cylinder to the lower front part of the boiler, substantially as set forth.

2. In a horizontal multitubular steam boiler, of the character described, a cross-

cylinder arranged in elevated position in the combustion chamber so as to be directly exposed to the heat emitted from the furnace flues, water tubes radiating from said cylinder toward the top, the bottom and the back of the boiler, a partition wall carried from the cylinder over a row of tubes to the back of the boiler above the furnace flues so as to compel the flue gases to pursue a circuitous route around the cylinder and across the water tubes, and tubes carried from the cylinder under said partition wall to the boiler and thence through the latter in a curve past the furnace flues to the lower front part of the boiler, there to terminate in a rearward bend, substantially as and for the purpose set forth.

3. In a horizontal multitubular steam boiler, of the character described, a cross-cylinder arranged in elevated position in the combustion chamber so as to be directly exposed to the heat emitted from the furnace flues, tubes radiating from said cylinder toward the top, the bottom and the back of the boiler, a super-heater in the upper part of the combustion chamber, a partition wall connecting the cylinder with the boiler so as to conduct the flue gases in a circle around the cylinder and across the water tubes and the super-heater, and tubes carried from the cylinder upward through the boiler and then, in a curve past the furnace flues down to the lower front part of the boiler, substantially as and for the purpose set forth.

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Witnesses:

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