

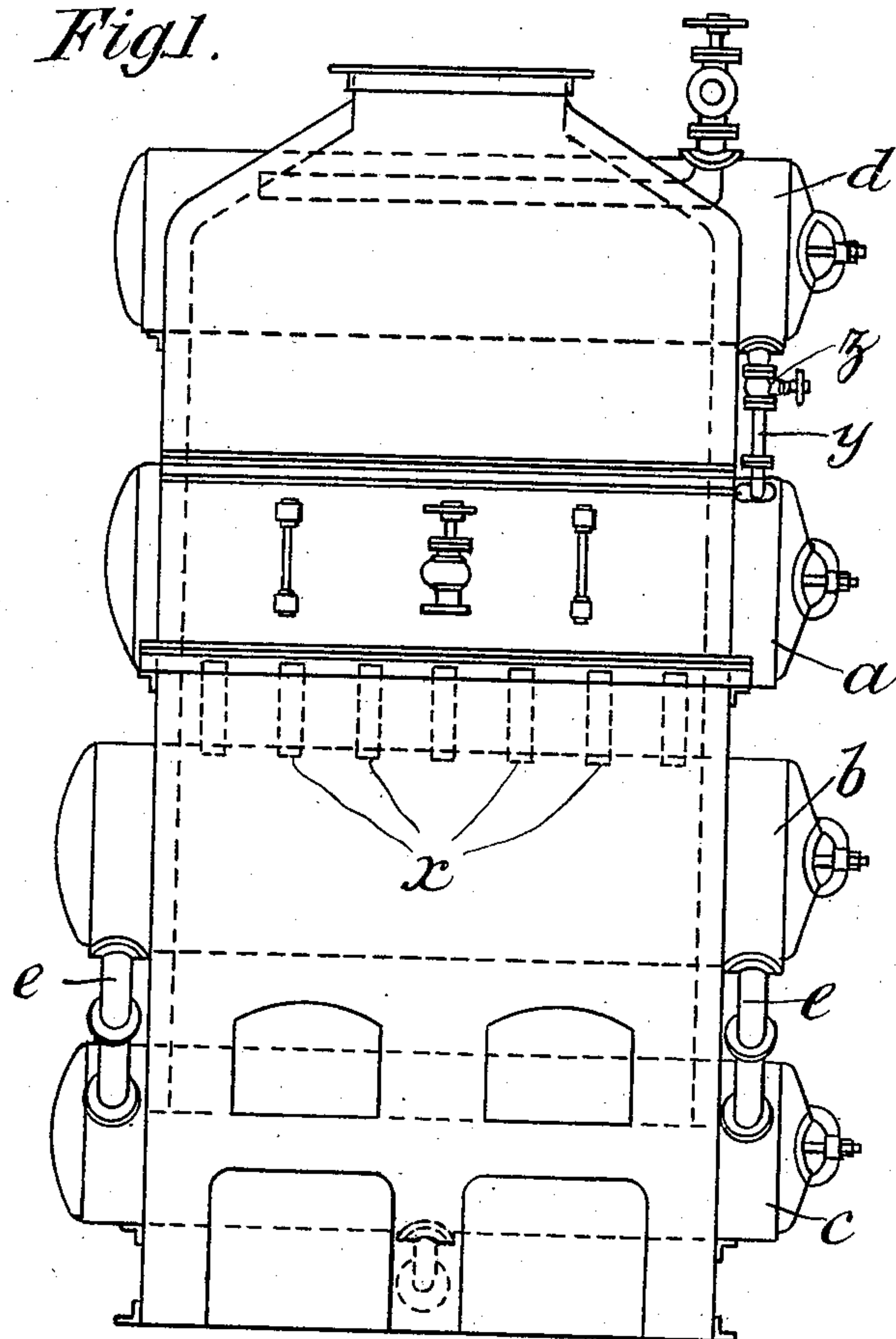
No. 861,460.

PATENTED JULY 30, 1907.

O. GUILLEAUME.
WATER TUBE BOILER.
APPLICATION FILED AUG. 13, 1906.

2 SHEETS—SHEET 1.

Fig 1.



Witness:
J. F. Tomick
L. Hymn

Inventor:
Otto Guillaume
J. Knight & Co.
Attorneys

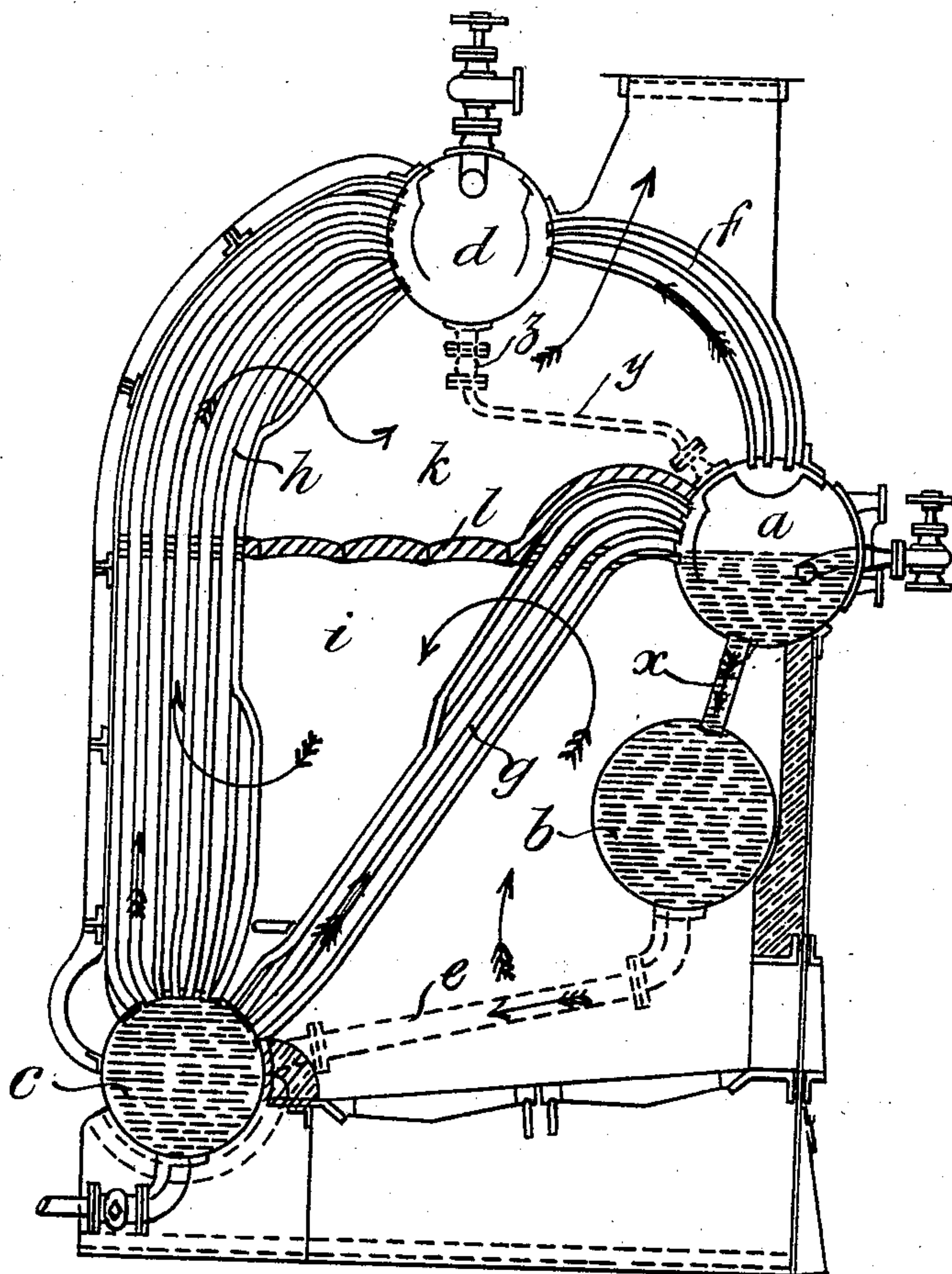
No. 861,460.

PATENTED JULY 30, 1907.

O. GUILLEAUME.
WATER TUBE BOILER.
APPLICATION FILED AUG. 13, 1906.

2 SHEETS—SHEET 2.

Fig. 2.



Witness:
P. F. Tomack.
L. Kyrre

Inventor:
Otte Guillaume
By Knight Bros.
Attorneys

UNITED STATES PATENT OFFICE.

OTTO GUILLEAUME, OF NEUSTADT-ON-THE-HARDT, GERMANY.

WATER-TUBE BOILER.

No. 861,460.

Specification of Letters Patent.

Patented July 30, 1907.

Application filed August 13, 1906. Serial No. 330,521.

To all whom it may concern:

Be it known that I, OTTO GUILLEAUME, a subject of the Emperor of Germany, residing at Neustadt-on-the-Hardt, Germany, have invented a new and useful Water-Tube Steam-Boiler, of which the following is a specification.

The invention relates to water-tube steam-boilers and has for its object the production of superheated steam as dry as possible, and to increase the production of steam.

In water-tube boilers as hitherto constructed, the steam produced is more or less wet. This drawback is avoided in the improved construction of boiler herein described, by arranging the steam-containing parts of the water-tubes very high above the ordinary water level, and in contact with the fire gases. The steam collector also is acted upon by the fire gases, so that any particles of water which are drawn along with the steam are therein converted into steam. Thus the steam produced is superheated and very dry, and the improved boiler may be regarded as a combination of a boiler and a superheater.

The invention is illustrated in the accompanying drawings as applied to a marine boiler.

Figure 1 is a front view and Fig. 2 is a sectional view.

The improved water-tube steam-boiler, as shown in the drawings, is constructed and arranged as follows. There are four horizontal cylindrical chambers or vessels, *a, b, c, d*, the ends of which extend a short distance beyond the furnace casing. The water-receiving chamber or vessel, *a*, is arranged in the front portion of the furnace casing, and has its axis in the line of the water level; a short distance below this water-receiving chamber, and within the furnace, is arranged a second chamber or vessel, *b*, which is connected directly to the first mentioned chamber or vessel *a*, by a series of tubes, *x*, within the furnace, and thus is filled with water from such first mentioned chamber *a*. The water in this second chamber or vessel *b* is the first to be heated. A third chamber or vessel, *c*, acting as a mud-collector, is arranged at the back end and preferably partly below the level of the firebars, and it is connected to the second chamber or vessel *b*, by tubes, *e*, outside the furnace casing, and receives water therefrom. The fourth chamber or vessel, *d*, acting as a steam-collector, is arranged at the top and within the furnace casing; it is connected to the top of the mud-collector *c*, by a series of water-tubes, *h*, at the back of the furnace, and to the top or water space of the water-receiving chamber or vessel *a*, by a series of water-tubes, *f*, crossing the entrance to the chimney. The chamber or vessel *a* (water-receiving chamber) is connected at and above the water level with the mud-collector by a series of inclined water-tubes, *g*, passing diagonally across the furnace. The boiler casing is di-

vided into an upper combustion chamber, *k*, and a lower combustion chamber, *i*, by a fire-proof wall or roof, *l*, at about the water-level.

The fire gases first act on the chamber or vessel *b*, thus warming the water for the first time; they then pass the inclined tubes *g* and enter the rear part of the lower combustion chamber *i*, where they pass among the water tubes *h* at the back of the furnace and thence enter the upper combustion chamber *k*; finally the fire gases pass to the chimney across the tubes *f* crossing the chimney entrance. The steam is thus superheated and dried in the upper parts of the back tubes *h* and in the tubes *f* crossing the chimney entrance, and in the steam-collector *d*, and any water particles drawn along with the steam are completely converted into steam. The upper part of the chamber or vessel *a* (water-receiving chamber) is also connected to the bottom of the steam-collector *d* by a tube, *y*, outside the furnace casing, and it is provided with a stop-cock or valve, *z*, to enable communication, by means of this tube *y*, between the two, to be established or cut off, as may be required.

When the invention is applied to a stationary boiler having its flue in the ground, the back tubes *h* are separated into two groups by a vertical wall or division. The fire gases then pass up one side of the wall or division into the upper combustion chamber *k*, and downwards on the other side of the wall or division into the chimney flue.

By the above construction of water tube boiler, the tubes *f* and the upper parts of the water tubes *g* and *h*, contain steam so that superheater and boiler are united and space and material thereby saved.

What I claim as my invention is:—

1. In a water tube boiler, the combination of water receiving and containing chambers at different levels within the lower combustion chamber of a furnace, a steam space in the uppermost of said chambers, a steam chamber at the uppermost part of the furnace above the water receiving chamber, water tubes within the furnace connecting the water receiving chamber with the water chamber next below it in level, tubes outside the furnace connecting the two lowermost water containing chambers, water tubes within the furnace containing steam in their upper parts and connecting the lowermost water containing or mud chamber with the water receiving chamber at and above the water level in the latter chamber, water tubes within the furnace containing steam in their upper parts and connecting the lowest water containing or mud chamber with the steam chamber at the upper part of the upper combustion chamber, steam tubes connecting the steam space of the water receiving chamber with the said steam chamber and a fireproof wall or roof at about the water level dividing the furnace into an upper combustion chamber containing the steam containing parts and a lower combustion chamber containing the water containing parts within the furnace, whereby the steam containing parts of the water tubes and the steam chamber are arranged high above the ordinary water

level and all the parts containing steam are acted upon by the fire gases.

2. In a water-tube steam-boiler, the combination of a water-receiving chamber having its axis at about the
5 water-level, a second water chamber connected to the water-receiving chamber by water-tubes within the furnace, a mud-collector at the bottom of the furnace partly below the level of the fire-bars, tubes outside the furnace casing connecting the second water chamber with the mud-col-
10 lector, a steam-collecting chamber at the upper part of the furnace, tubes at the back of and within the furnace connecting the mud-collector with the steam chamber, tubes within the furnace connecting the steam chamber with the water-receiving chamber and crossing the en-

trance to the chimney, a tube outside the furnace con- 15
necting the bottom of the steam chamber with the upper part of the water-receiving chamber, a stop-cock on the last-mentioned tube, inclined tubes crossing the furnace and connecting the mud-collector with the water-receiving chamber, and a fire-proof wall or roof within the furnace 20
at about the water-level.

In witness whereof I have hereunto set my hand in presence of two witnesses.

OTTO GUILLEAUME.

Witnesses:

BESSIE F. DUNLAP,
LOUIS VANDORY.