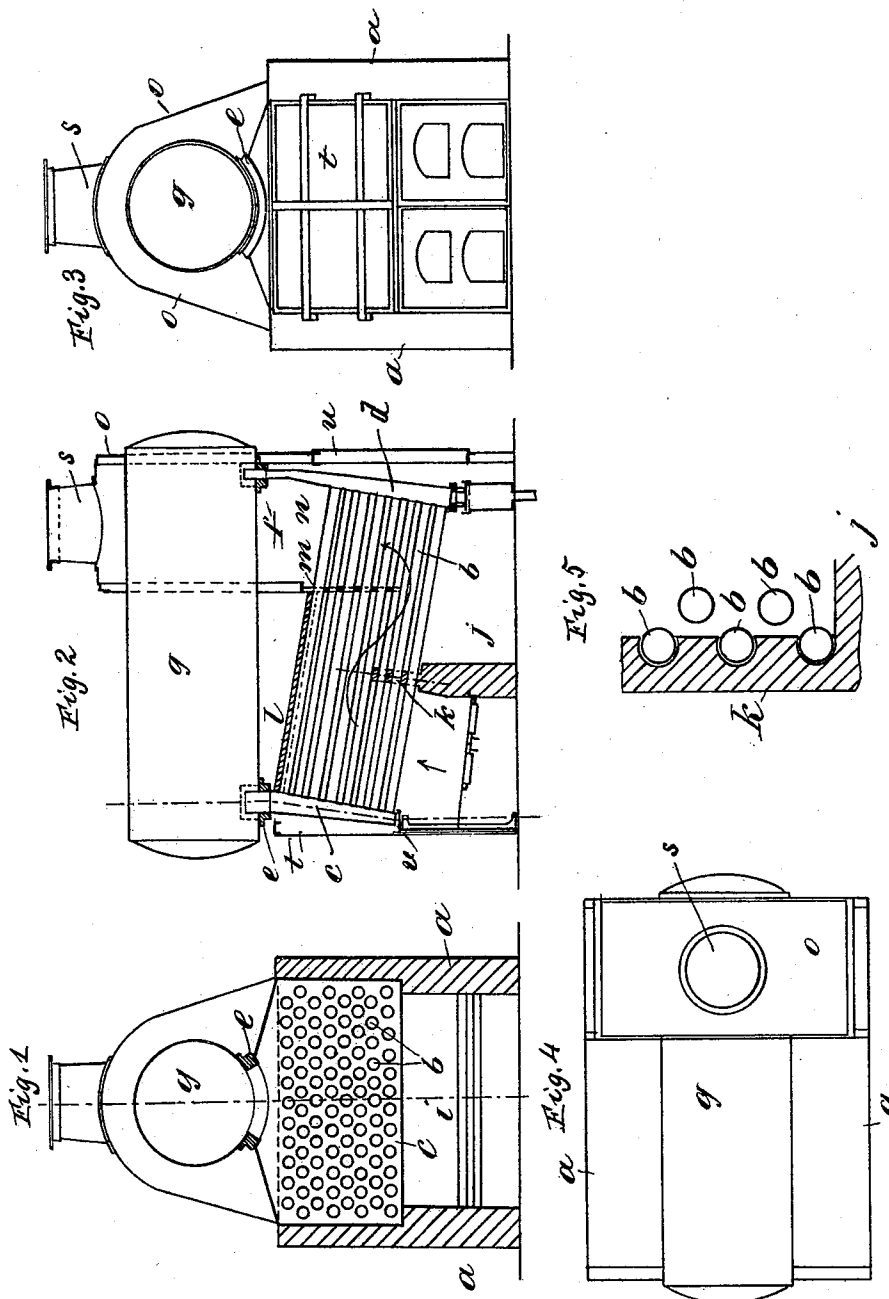


(No Model.)

H. GÖHRIG.
STEAM BOILER.

No. 583,466.

Patented June 1, 1897.



Witnesses:

F. H. Wimmer
Chas. Morgan

Inventor:

Heinrich Göhrig
by *A. P. Thayer*
his Attorney

UNITED STATES PATENT OFFICE.

HEINRICH GÖHRIG, OF DARMSTADT, GERMANY.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 583,466, dated June 1, 1897.

Application filed April 9, 1896. Serial No. 586,796. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH GÖHRIG, a subject of the Grand Duke of Hesse-Darmstadt, residing at Darmstadt, in the Grand Duchy of Hesse-Darmstadt and German Empire, have invented new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention relates to steam-boilers consisting partly of water-tubes and partly of a superposed drum and means of communication between the respective ends of the tubes and the drum; and the essential feature of the invention is in the said means of such communication, as hereinafter described, reference being made to the accompanying drawings, in which—

Figure 1 is a transverse sectional elevation of my improved boiler, taken on line 2 2 of Fig. 2. Fig. 2 is a longitudinal sectional elevation taken on line 3 3, Fig. 1. Fig. 3 is a front elevation. Fig. 4 is a top plan view; and Fig. 5 is a detail section on line 4 4, Fig. 2.

Between two side walls *a*, of refractory material, I arrange a multitude of water-tubes *b* side by side in suitably close proximity and on a descending inclination from front to rear, with a chambered front head *c* and rear head *d*, into the insides of which the water-tubes are expanded for communication between them, and the upper ends of these chambers are formed as saddles *e* and *f* for support of the superposed horizontal drum *g*, and communicating passages *h* are provided through the saddles into the drum for circulation of the water freely through the tubes and drum and escape of steam from the tubes into the drum. The front chamber *c* is of gradually-increasing area of cross-section from the bottom upward, while the rear chamber *d* is the reverse, and the passage from the front chamber into the drum is larger than from the rear chamber, which, together with the ascending inclination of the tubes toward said front chamber, favors the flow of water upward into the drum through the front chamber and downward into the tubes through the rear chamber unobstructed by any tendency in the opposite direction.

The furnace *i* is located under the front portion of the tubes with a bridge-wall *j* at a suitable distance, with an abutment *k* at

each end rising a suitable height to prevent the heat products from escaping directly along the lower tubes and deflecting them upward for better effects on the upper tubes.

An asbestos or other refractory cover *l* extends from the front chamber *c* over the tubes to a suitable distance beyond the bridge-wall and terminates at a deflector *m*, directing the heat products downward among the tubes, after which they escape upward in the passages *n* of a hood *o*, along the sides of the rear end of the drum, to the smoke-pipe *s*.

Suitable inclosing front and back plates *t* and *u* are employed at the ends of the furnace with transverse supports *v* and *w* for the chambers *c* and *d*.

It will be seen that my improved construction is simple and cheap and provides an efficient boiler applicable for stationary setting in conditions favoring ready removal and also well adapted for use in marine service.

I claim—

1. In a water-tube and superposed water and steam drum boiler, the combination of the cluster of rearwardly-descending water-tubes, front and rear water-chambers communicating with the tubes, the superposed steam and water drum, and saddles of upper ends of the water-chambers supporting said drum and having passages forming communications between them and the drum, the front tube-chamber having gradually-increasing cross-sectional area from bottom upward, and the rear chamber like increasing cross-sectional area from the drum downward and the opening from the front chamber into the drum being larger than the opening from the drum into the rear chamber to facilitate circulation substantially as described.

2. In a water-tube and superposed water and steam drum boiler, the combination of the cluster of rearwardly-descending water-tubes, front and rear water-chambers communicating with the tubes, horizontal drum seated on and communicating with the water-chambers, said water-chambers forming the ends of the furnace-chamber, and side walls and a cover inclosing the sides and top of the furnace-chamber, the front tube-chamber having gradually-increasing cross-sectional area from bottom upward, and the rear chamber like increasing cross-sectional area from

the drum downward and the opening from the front chamber into the drum being larger than the opening from the drum into the rear chamber to facilitate circulation substantially
5 as described.

3. In a water-tube and superposed water and steam drum boiler, the combination of the cluster of rearwardly-descending water-tubes, front and rear water-chambers communicating with the tubes, horizontal drum
10 seated on and communicating with the water-chambers, said water-chambers forming the end walls of the furnace-chamber, side walls, and a cover inclosing the sides and top of the
15 furnace-chamber, and the hood forming passages up along the sides of the drum and ter-

minating in the smoke-pipe, the front tube-chamber having gradually-increasing cross-sectional area from bottom upward, and the rear chamber like increasing cross-sectional
20 area from the drum downward and the opening from the front chamber into the drum being larger than the opening from the drum into the rear chamber to facilitate circulation
25 all substantially as described.

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

HEINRICH GÖHRIG.

Witnesses:

ADOLFE AMANN,
ALVESTO S. HOGUE.