

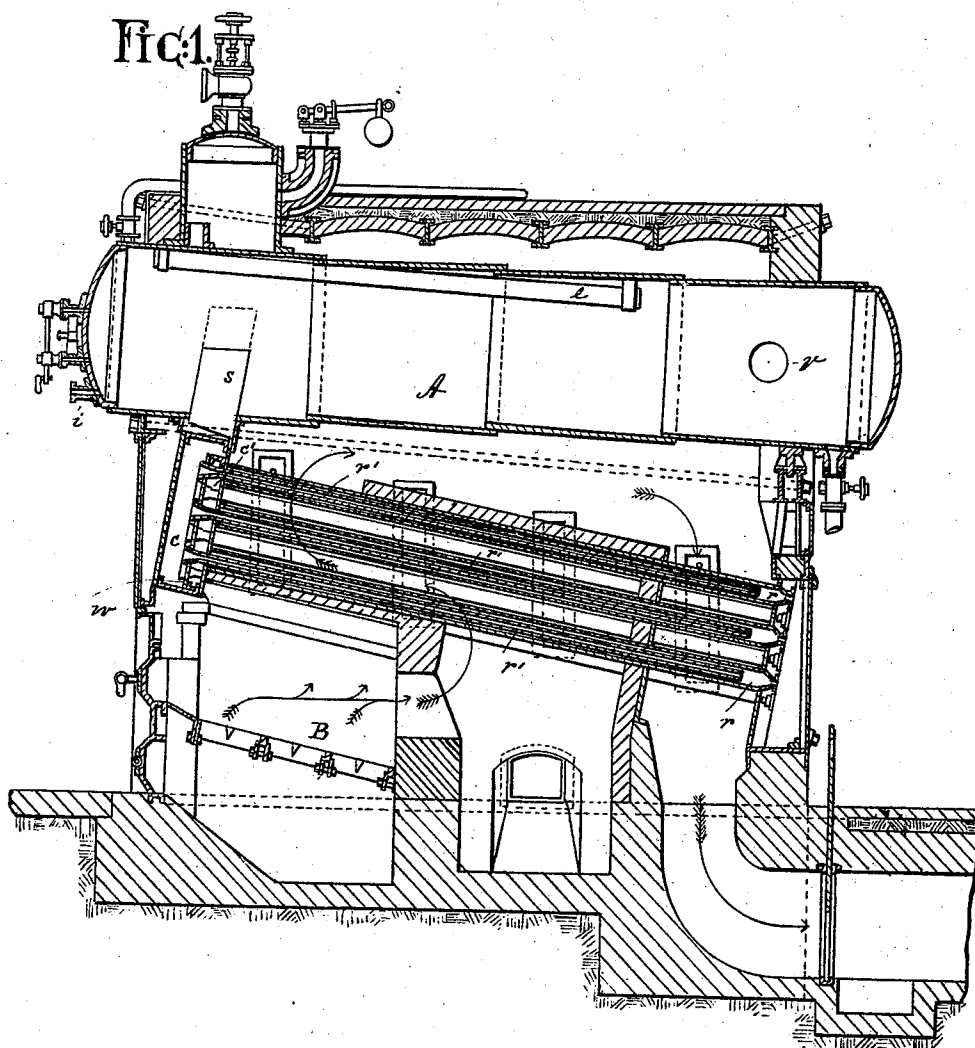
(No Model.)

2 Sheets—Sheet 1.

G. DÜRR,
STEAM BOILER.

No. 501,612.

Patented July 18, 1893.



Witnesses:
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A. Goughmans

Inventor:
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attorneys

(No Model.)

2 Sheets—Sheet 2.

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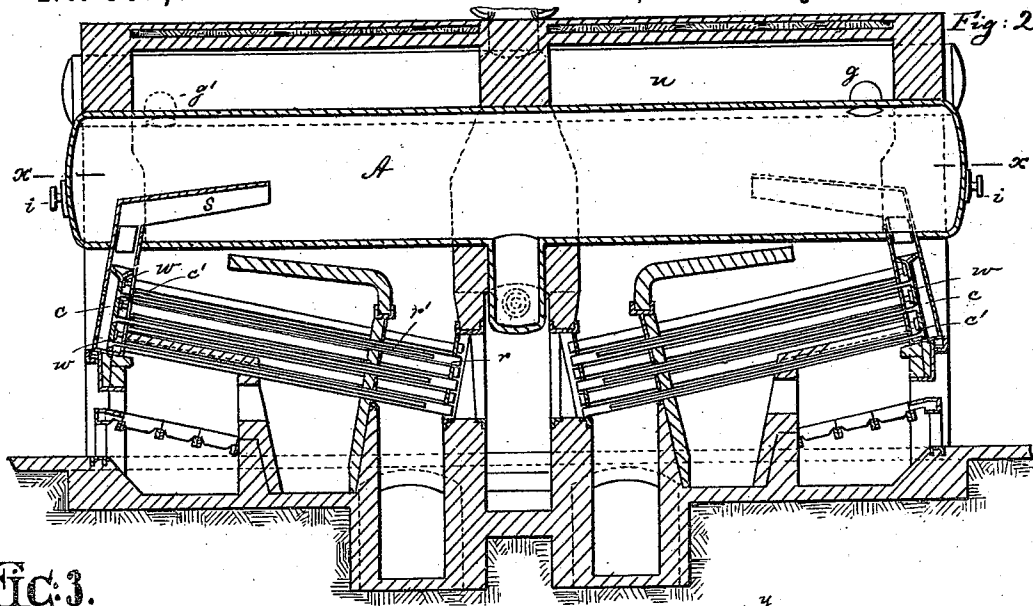


Fig. 3.

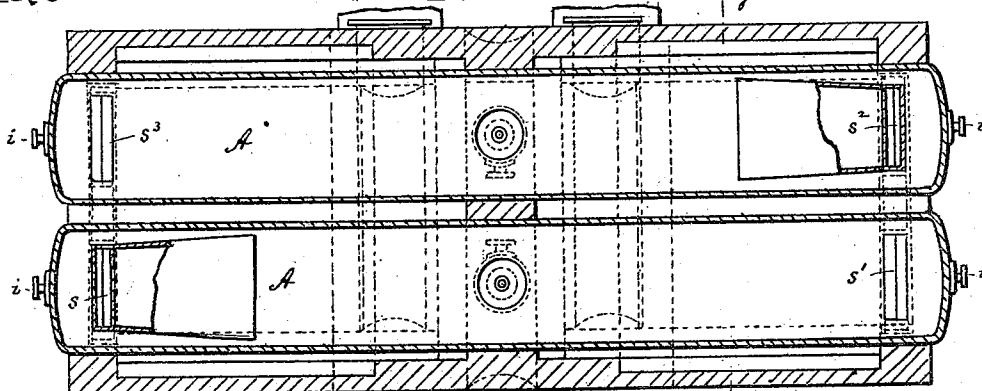
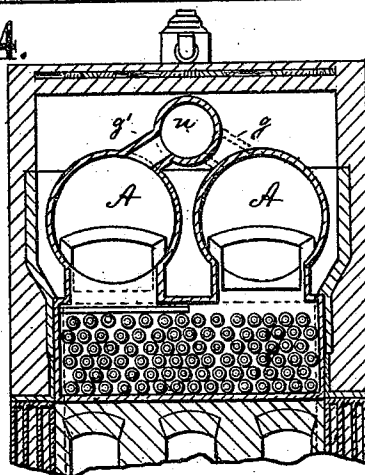


Fig. 4.



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UNITED STATES PATENT OFFICE.

GUSTAV DÜRR, OF DUSSELDORF, GERMANY.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 501,612, dated July 18, 1893.

Application filed February 1, 1893. Serial No. 460,608. (No model.) Patented in Germany October 29, 1889, No. 53,449.

To all whom it may concern:

Be it known that I, GUSTAV DÜRR, a subject of the German Emperor, residing at Düsseldorf, Germany, have invented certain new and useful Improvements in Steam-Boilers, (for which I have obtained a patent in Germany, No. 53,449, dated October 29, 1889,) of which the following is a specification.

This invention relates to a steam boiler in which a thorough circulation of the water, and consequently a thorough utilization of fuel, takes place. Hand holes having covers of peculiar construction permit ready access to the feed and heating tubes.

In the accompanying drawings: Figure 1 is a vertical longitudinal section of my improved boiler; Fig. 2 a vertical longitudinal section of a double boiler; Fig. 3 a horizontal section on line *x, x*, Fig. 2; Fig. 4 a cross section on line *y, y*, Fig. 3.

The water room into which enter the feed tubes *r'*, and the heating tubes *r*, is by a partition *w*, divided into two compartments *c, c'*. The feed tubes *r'*, enter the compartment *c*, while the heating tubes *r*, enter the compartment *c'*. Two upper water boilers *A*, are placed above the tubes and are connected with each other, near their rear end by a coupling *v*. One of the boilers *A*, is connected to the compartment *c*, while the other boiler is connected to the compartment *c'*. The water fed into one of the boilers at *e*, flows to the rear of the boiler and passes through connection *v*, into the second boiler. Here the water flows toward the front and enters the compartment *c*. It flows from compartment *c*, through the feed tubes *r'*, and through the rear open ends of the same into the heating tubes *r*. Through the tubes *r* the water flows forward entering compartment *c'*, which as has already been stated is connected to the first boiler *A*. Thus a thorough circulation is effected. The formation of steam commences in the heating tubes *r*, which are made quite thin and which are subjected to the action of the heat from furnace *B*. The heat travels as indicated by the arrows Fig. 1.

By causing the steam to come into contact with the feed water, the latter is heated sud-

denly and will consequently cause the mud and sediment to be quickly and thoroughly separated. This separation takes place principally in the rear ends of boilers *A*, back of the connection *v*. The boilers *A*, are slightly inclined from front to rear and in their rear end no circulation takes place and consequently these rear ends form convenient mud chambers, from which the mud may be readily removed through suitable openings.

In lieu of using two connected upper boilers *A*, I may, of course, use one single boiler provided with a perforated partition.

In Figs. 2 to 4, I employ a double system of tubes under each of the upper boilers, which latter are made of increased length.

Above the boilers *A*, and connected therewith by tubes *g, g'*, is a superheater *u*, filled with steam. The left hand tube boiler, supplies the steam-carrying-water through connections *s*, to one upper boiler *A*, while the right hand tube boiler supplies the steam-carrying-water through connections *s²*, to the other upper boiler. Within the upper boiler the steam separates from the water and the steam that has entered through connections *s*, passes through tube *g*, into the superheater *u*, while the steam that has entered through connection *s²*, into the other boiler, passes in the opposite direction through tube *g'*, into the superheater. The water flows through the connections *s², s'*, into the chambers *c*, and together with the fresh feed water introduced at *i*, passes through the tubes in the manner already described.

What I claim is—

1. The combination of two connected water boilers *A*, with a water room divided into two compartments *c, c'*, and with a series of feed pipes and heating pipes, all being so constructed that one of the boilers together with the feed pipes communicate with compartment *c*, while the other boiler and the heating pipes communicate with compartment *c'*, substantially as specified.

2. The combination of two sets of feed pipes and heating pipes, with divided water room *c, c'*, and with two water boilers *A*, all being so constructed that the compartment *c*, of one

set of pipes connects with one boiler A, at
one end and the compartment c, of the other
sets of pipes connects with the other boiler
A, at the other end, while the compartment
5 c', connects with the boilers at the opposite
ends, substantially as specified.

In testimony whereof I have signed this

specification in the presence of two subscri-
ing witnesses.

GUSTAV DÜRR.

Witnesses:

HANS FRIEDRICH,
D. J. PARTELLO.