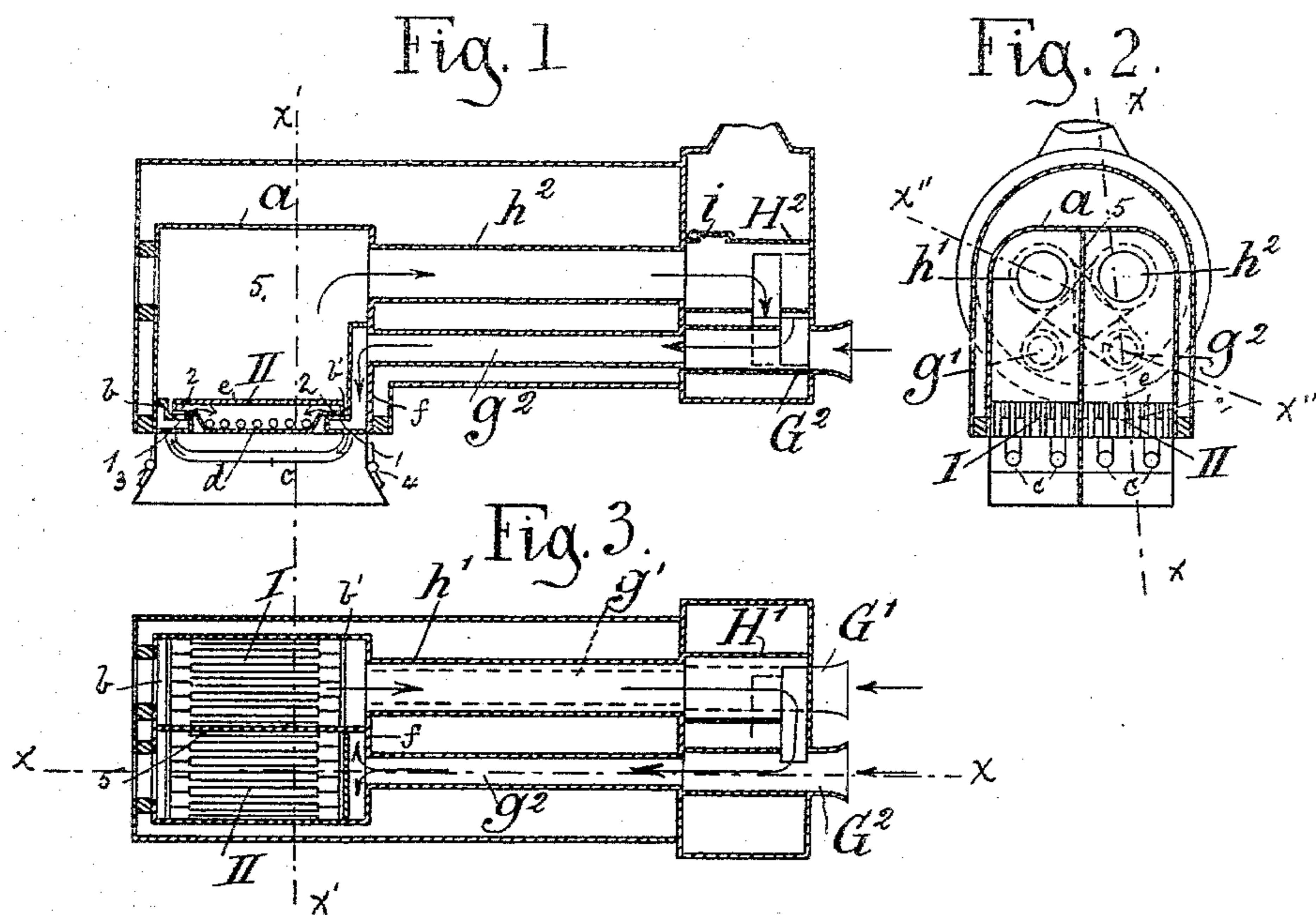


(No Model.)

J. R. MÜLLER-LANDSMANN.  
STEAM BOILER.

No. 545,370.

Patented Aug. 27, 1895.



Witnesses.

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# UNITED STATES PATENT OFFICE.

JAKOB ROBERT MÜLLER-LANDSMANN, OF LOTZWIJL, SWITZERLAND.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 545,370, dated August 27, 1895.

Application filed March 14, 1895. Serial No. 541,773. (No model.)

*To all whom it may concern:*

Be it known that I, JAKOB ROBERT MÜLLER-LANDSMANN, a citizen of Switzerland, residing at Lotzwijl, canton of Berne, Switzerland, have  
5 invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-  
10 pertains to make and use the same.

This invention relates to certain improvements in steam-boilers whereby perfect combustion of fuel is insured, as well as a thorough consumption of all smoke and gases  
15 arising from same.

My invention is especially adapted for locomotive-boilers, inasmuch as it provides for obtaining the greatest amount of heat from a limited quantity of fuel.

20 The invention is fully illustrated in the accompanying drawings, whereon—

Figure 1 is a vertical longitudinal section of a locomotive-shaped boiler provided with my improvements. Fig. 2 is a vertical trans-  
25 verse section through the fire-box thereof, and Fig. 3 a longitudinal horizontal section of the boiler.

The section of Fig. 1 is made through the line  $xx$  of Figs. 2 and 3, the section of Fig. 2  
30 is through the line  $x'x'$  of Figs. 1 and 3, and the section of Fig. 3 through the line  $x''x''$  of Fig. 2.

The letter  $a$  designates the fire-box of the boiler, which is divided into compartments  
35 I II by means of a vertical longitudinal partition 5. The lower part of each compartment of the fire-box is provided at its front and rear with horizontal hollow supports  $b b'$  for the grate-bars  $e$ , the latter made hollow  
40 and provided at the under side of each bearing-surface with openings 1 to match openings 2, formed in the upper surface of the supporting-bars  $b b'$ . The bars  $b b'$  are connected at their under sides by pipes  $c$ , and  
45 the sides of the grate-bars are provided with holes  $d$  for the passage of smoke and gases, as hereinafter more fully described. The support  $b'$  has the rear of its top surface turned upward and connected with the tube-  
50 plate  $f$ , so as to leave an air-space between same. This space communicates with the

smoke-chamber of the boiler by pipes  $g' g^2$ , over the forward ends of which are fitted receiving air-pipes  $G' G^2$ , having outwardly-projecting flaring mouths for the more ready  
55 admission of air. Dampers may be applied within the pipes  $G' G^2$  or in the mouths thereof for regulating the inflow of air should same be required.

The fire-box and smoke-chamber are con-  
60 nected above the pipes  $g' g^2$  by flues  $h' h^2$ , the flue  $h'$  and air-pipe  $g^2$  and the flue  $h^2$  and air-pipe  $g'$  being diagonally connected at the smoke-chamber end of the boiler, so that the smoke and gases from grate I shall  
65 pass through flue  $h'$  and return by pipe  $g^2$ , mixed with fresh air, to the under side of the grate in compartment II and the smoke and gases from grate II escape through flue  $h^2$   
70 into air-pipe  $g'$  and be conveyed by same, also mixed with fresh air, to the under side of grate I, by which means absolute combustion is effected.

The dampers 3 4 of the ash-box are intended to be kept closed during the operation of the  
75 invention, in order that the air admitted to the grate-bars shall follow the course indicated by the arrows in Figs. 1 and 3. The said air, entering the pipes  $G' G^2$ , passes rearwardly and is heated in the pipes  $g' g^2$ ; thence it  
80 passes downwardly to the grate-supports  $b b'$  and into the grate-bars  $e$ , escaping through the side holes  $d$  thereof, in a superheated state, into the fuel, and thus producing smokeless combustion.

85 The pipes  $H' H^2$  are provided with slides  $i$  to permit the smoke to escape through the smoke-stack when the fire is first started.

If desired, the flues  $h' h^2$  and the pipes  $g' g^2$  can be provided with injectors, ventilators, &c.  
90

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a steam boiler, of ash pits, a fire-box divided by a partition, an  
95 upper set of flues  $h', h^2$ , and lower set of pipes  $g', g^2$ , passing through the boiler, the upper flues  $h', h^2$ , are connected at one end of the fire-chamber, and at the other to the diagonally opposite and forward end of the return  
100 pipes  $g^2, g'$ , respectively, said return pipes connected to the ash pit, whereby the pro-

ducts of combustion from one side of the divided furnace are transferred into the ash-pit of the other, substantially as described.

2. The combination in a steam boiler, of  
5 ash pits, a fire-box divided by a partition, an upper set of flues  $h'$ ,  $h^2$ , and lower set of pipes  $g'$ ,  $g^2$ , passing through the boiler, the upper flues  $h'$ ,  $h^2$ , being connected at one end of the fire-chamber, and at the other end to the di-  
10 agonally opposite and forward end of the return pipes  $g'$ ,  $g^2$ , respectively, the return pipes connected to the ash-pit, as described, and the front ends of the pipes  $g'$ ,  $g^2$ , pro-

vided with outwardly projecting air-pipes, so that the products of combustion from one side 15 of the divided furnace, shall be mixed with fresh air during its transfer to the ash pit of the other side of the furnace, substantially as set forth.

In testimony whereof I have affixed my sig- 20 nature in presence of two witnesses.

JE. ROB. MÜLLER-LANDSMANN.

Witnesses:

C. HANSLIN,

FR. W. MANI.