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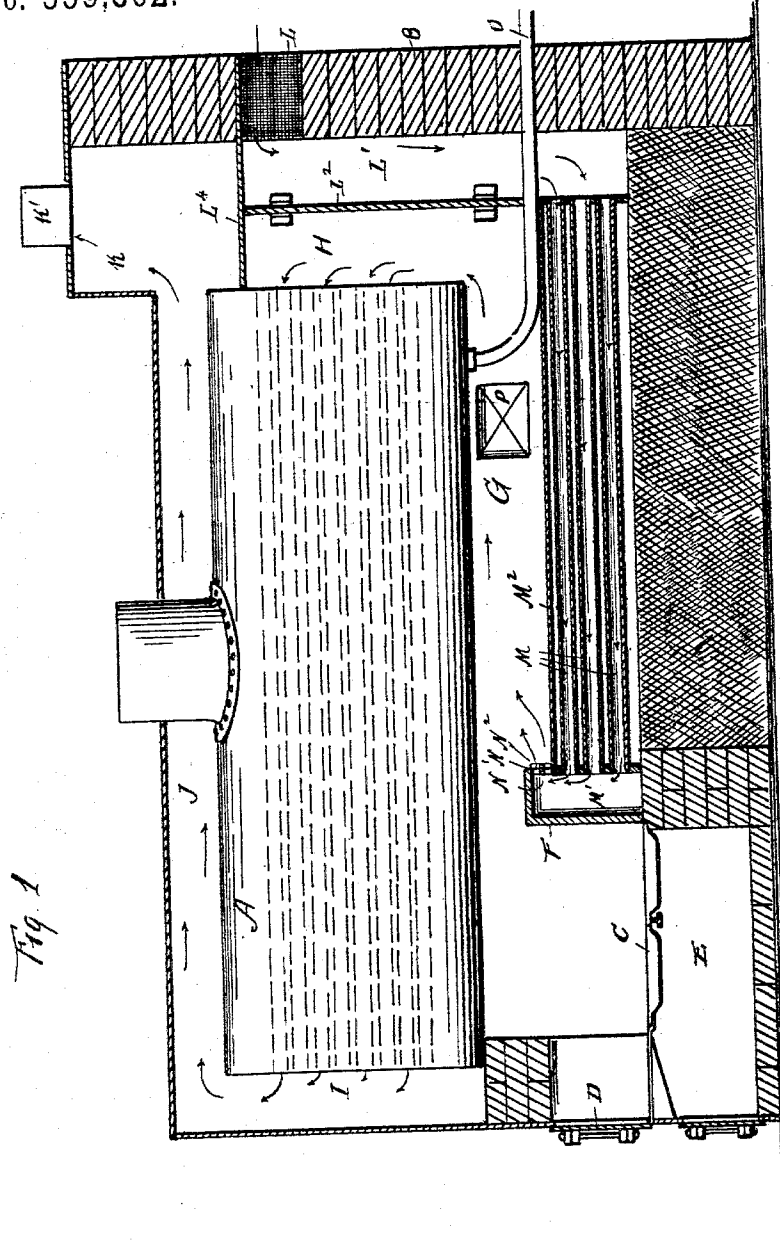
2 Sheets—Sheet 1.

J. PRICE.

GAS CONSUMER AND FUEL ECONOMIZER.

No. 559,602.

Patented May 5, 1896.



WITNESSES

*G. M. Anderson*  
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INVENTOR

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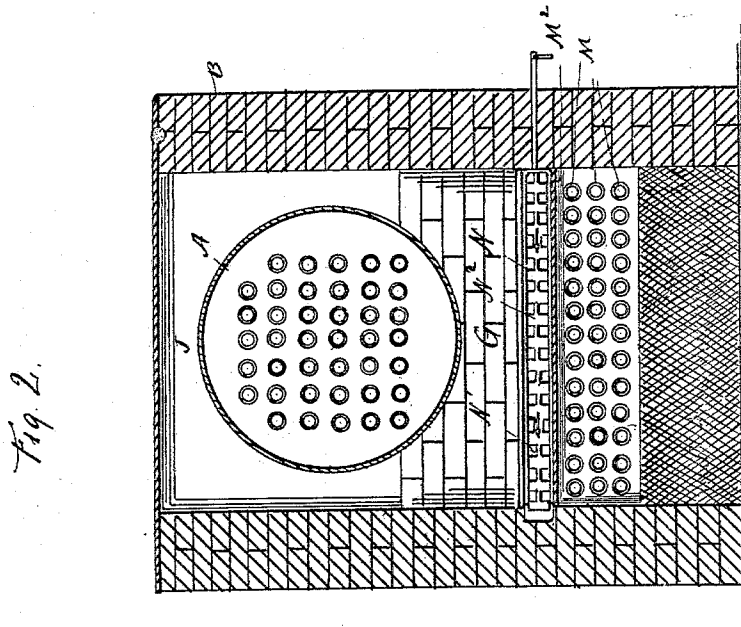
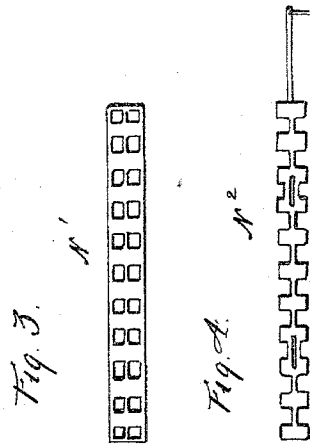
(No Model.)

2 Sheets—Sheet 2.

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WITNESSES

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# UNITED STATES PATENT OFFICE.

JOHN PRICE, OF TRENTON, NEW JERSEY.

## GAS-CONSUMER AND FUEL-ECONOMIZER.

SPECIFICATION forming part of Letters Patent No. 559,602, dated May 5, 1896.

Application filed January 11, 1896. Serial No. 575,157. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN PRICE, a subject of the Queen of Great Britain, and a resident of Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Gas-Consumers and Fuel-Economizers; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a representation of a central longitudinal section through furnace. Fig. 2 is a cross-section in line  $x x$ , Fig. 1. Figs. 3 and 4 are details of grate  $N'$  and damper therefor.

The object of this invention is to provide means in connection with a steam-boiler furnace for securing a more perfect combustion, whereby a large percentage of the fuel which is usually carried off in the smoke and gases unconsumed may be burned and the heat thereof utilized.

With this object in view the invention consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims.

Referring to the accompanying drawings, the letter A designates an ordinary horizontal boiler; B, the furnace-wall; C, the fire-grate; D, the fire-door; E, the ash-pit, and F the bridge.

G is the smoke and gas or combustion chamber to the rear of the bridge.

H is the smoke and gas chamber at the rear of the boiler and into which its flues open; I, the smoke and gas chamber at the front end of the boiler and into which the opposite ends of the flues open, and J the smoke-passage along the upper wall of the boiler and between it and the outer shell or covering  $J'$ .

K is the uptake, and  $K'$  the stack.

L is an opening in the rear end wall of the furnace, which communicates with the upper end portion of a vertical air chamber or flue  $L'$ , which is located behind the smoke and gas chamber H and is separated therefrom by a

vertical wall  $L^2$ . The flue or chamber  $L'$  extends from the horizontal wall  $L^4$ , which separates it from the uptake, to the bottom of the combustion-chamber G.

M designates a series of small longitudinal flues which are arranged side by side in the lower portion of the chamber G, across the full width thereof, their rear ends opening into the lower portion of the flue  $L'$  and their forward ends into a chamber  $M'$  of the fire-bridge F, which is hollow. These flues extend to nearly the height of the fire-bridge and are covered at the top by a metal plate or plates  $M^2$ . In the drawings I have shown these flues as consisting of a series of iron tubes; but they may be made of fire-brick or fire-clay, in which event the plate  $M^2$  forms the cover or upper wall thereof. In the construction shown said plate forms the cover of the chamber in which the tubes are placed, and not only protects the same from the direct action of the flames, but also prevents the deposit between them of cinders, soot, &c. Inasmuch as this plate is directly exposed to the flames passing over it it becomes heated to a high degree and thereby heats the flues.

N is an opening at the upper rear portion through which the heated air escapes into the chamber G.  $N'$  is a grate placed across the said opening for the purpose of spreading the hot air among the smoke and gases that pass the bridge, and  $N^2$  is a sliding damper for controlling the openings in the said grate.

O is a blow-off pipe for the boiler, and P is a door or manhole through which the flues M may be cleaned out.

When the furnace is in operation, cold air is drawn in through the opening L and down the flue  $L'$  into the flues M. In passing through these heated flues the air becomes highly heated, and passing into the hollow bridge is still further heated, so that when it is discharged into the chamber G it produces a high degree of combustion therein underneath the boiler and through the tubes or flues thereof as long as the gases hold out. After the smoke and unconsumed gases, if such remain, pass the boiler tube or flues they enter chamber I, thence through the passage I to the uptake and stack. Before reaching

the latter, however, they have parted with a large degree of their heat, which is effectually utilized in the boiler.

5 The more perfect combustion secured by this invention not only causes a great saving of fuel and a more uniform heat, which saves and prolongs the life of the boiler, but it also results in a much less deposit of soot in the boiler-flues.

10 It will be understood that the invention is not limited in its application to the particular furnace herein shown and described, but may be applied to furnaces and boilers of other kinds.

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

1. In a steam-boiler furnace, the combination with the supporting-wall having the opening L in its rear end wall, opposite the upper rear portion of the boiler, of the vertical flue, L<sup>1</sup> with whose upper portion said opening communicates, the vertical wall L<sup>2</sup> which separates said flue from the smoke and combustion chamber at the rear end of the boiler, the series of small longitudinal flues underneath the boiler and communicating at their rear ends with the lower portion of the flue L<sup>1</sup>, the cover-plate M<sup>2</sup> over said flues, and the  
30 hollow bridge into which said flues open at

their forward ends, and which has discharge-openings in its upper rear portion, substantially as specified.

2. The combination with a steam-boiler having flues a chamber at each end of the boiler into which said flues open at their respective ends, a smoke-passage along the upper wall of the boiler connecting the chamber at the front end with the uptake and stack and a combustion-chamber underneath the boiler and communicating with the chamber at the rear end thereof, of a hollow bridge at the forward end of said combustion-chamber, said bridge having an escape-opening at its rear portion, a series of longitudinal flues at the bottom of said combustion-chamber and across the full width thereof, said flues at their front ends opening into the chamber of said bridge, and a vertical air-flue to the rear of the combustion and rear smoke chambers, and leading to the rear ends of said longitudinal flues, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN PRICE.

Witnesses:

THOMAS H. HILL,

J. H. FETTER.