

No. 607,738.

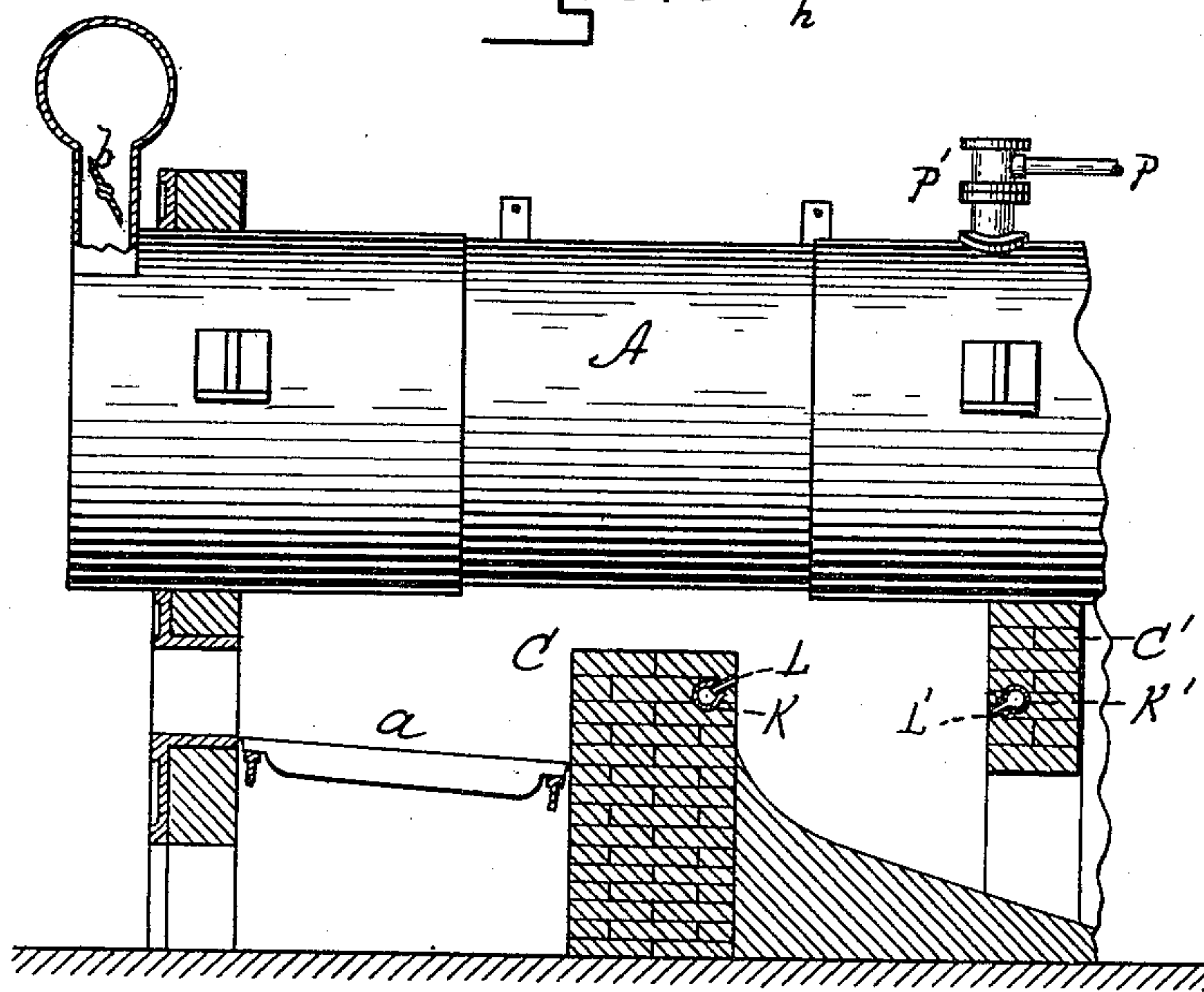
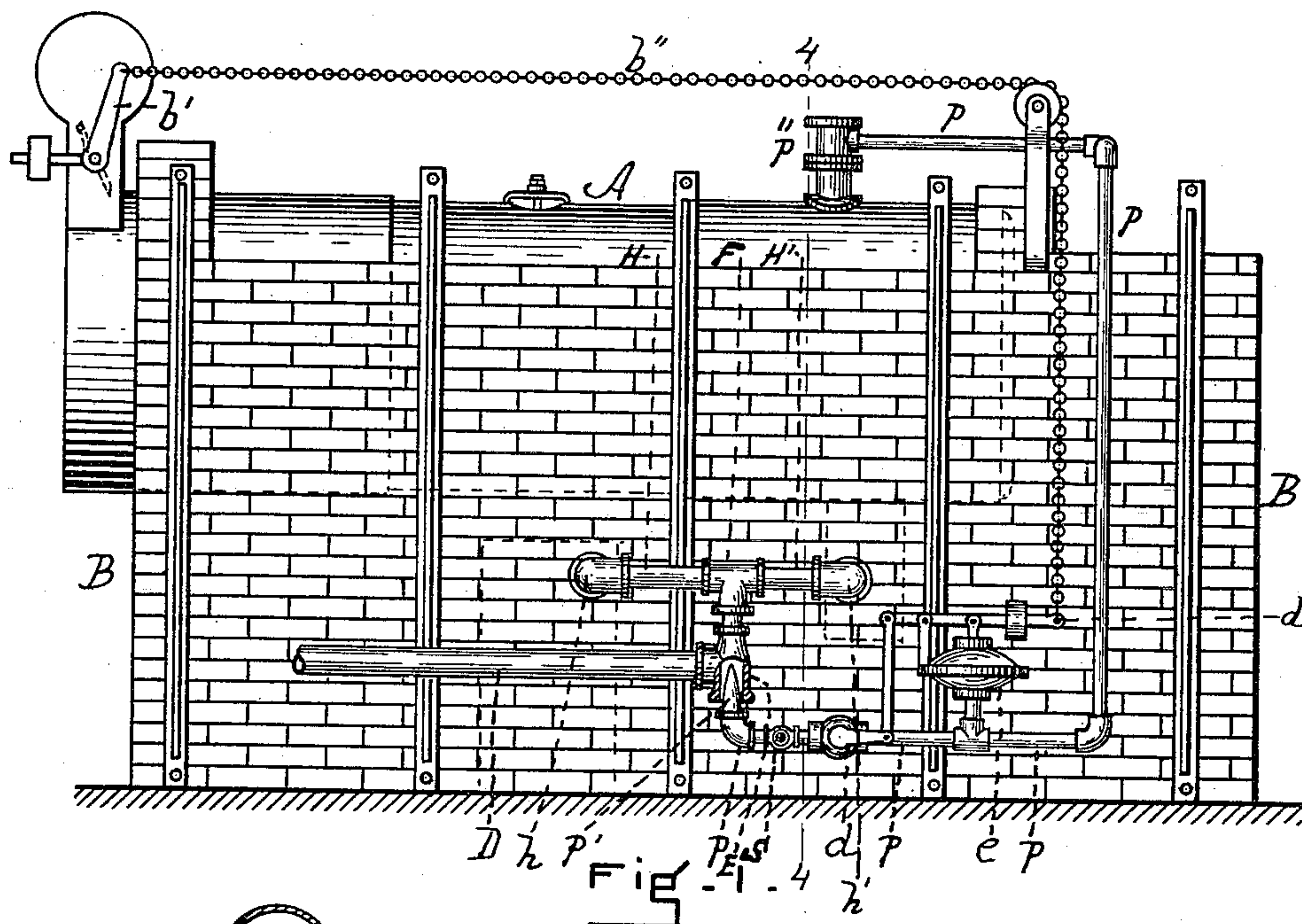
Patented July 19, 1898.

E. J. ELMS.
STEAM BOILER FURNACE.

(Application filed Mar. 28, 1898.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES
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Fig. 2.

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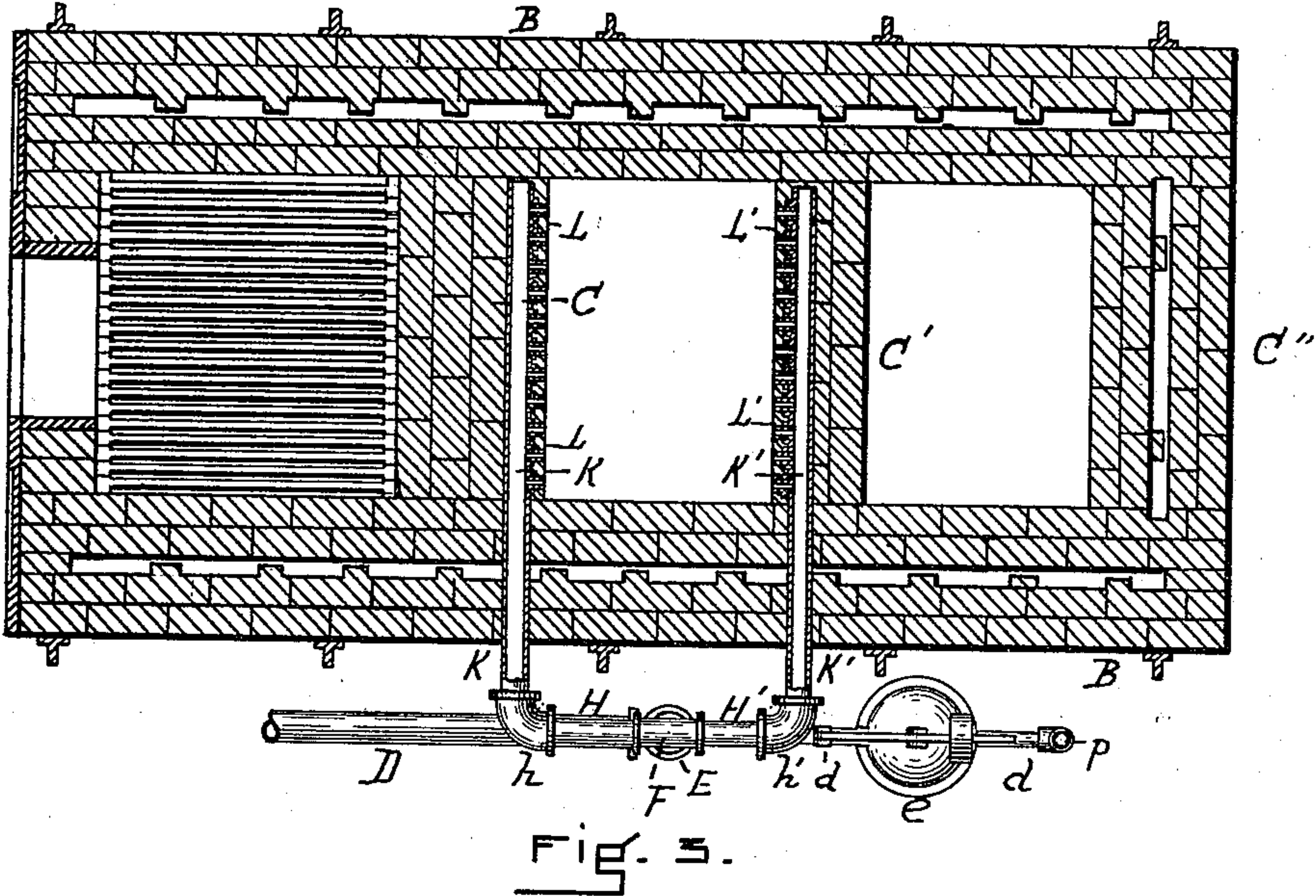


Fig. 3.

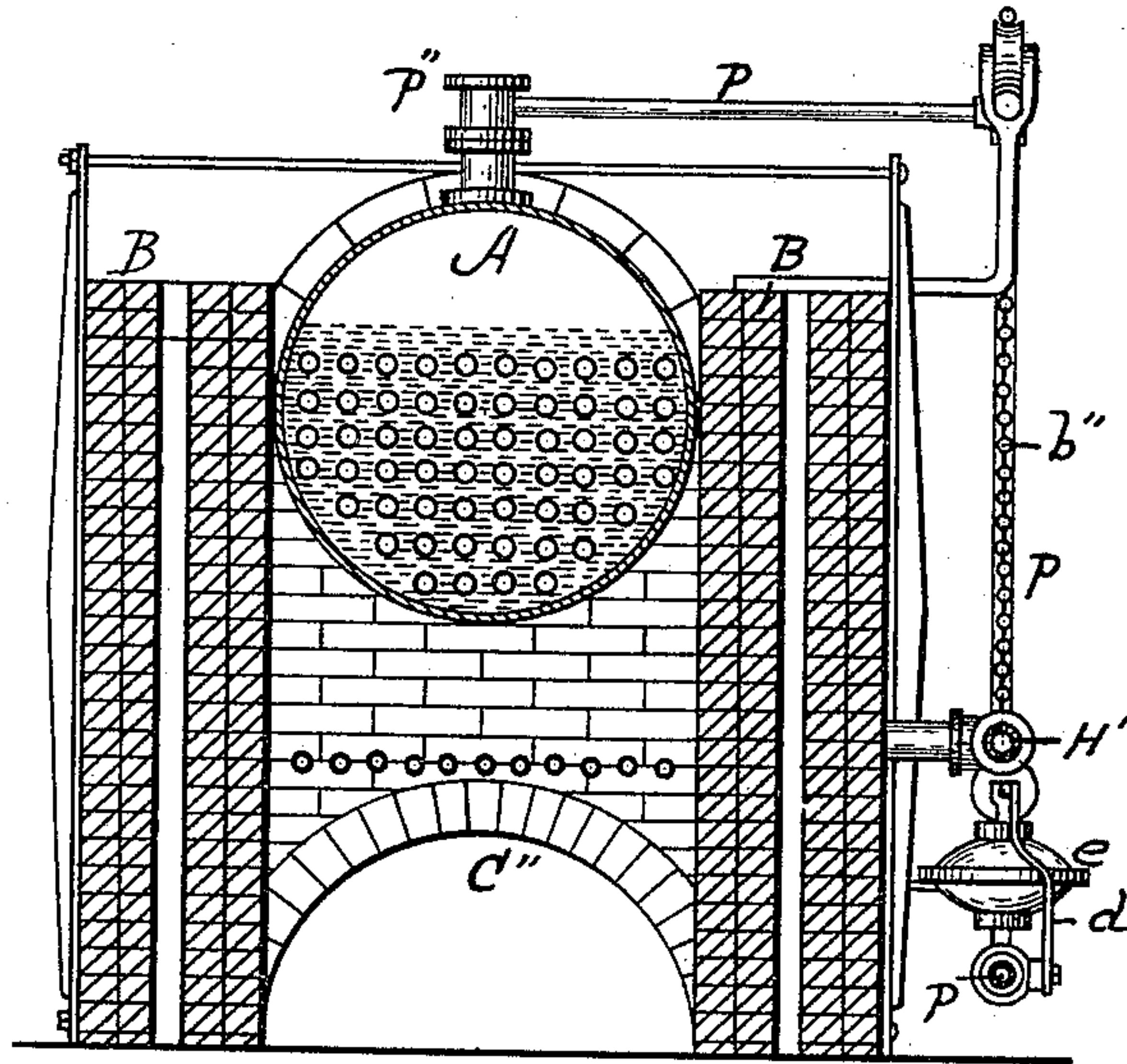


Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

EDWIN J. ELMS, OF CHELSEA, MASSACHUSETTS.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 607,738, dated July 19, 1898.

Application filed March 28, 1898. Serial No. 675,419. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. ELMS, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Steam-Boiler Furnaces, of which the following is a specification.

This invention relates to a novel construction whereby a jet of steam injected into an air-pipe by the action of an automatic damper-regulator introduces air in numerous small jets into the furnace, discharging it in a heated condition thereinto at or near the points where the light gases pass over the bridge-wall and under the back arch, thereby aiding combustion by mingling with the gases the warm air drawn into the furnace by the steam-jet.

The nature of the invention is fully described in detail below, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a steam-boiler furnace embodying my invention. Fig. 2 is a longitudinal section showing the boiler in elevation. Fig. 3 is a horizontal section of the furnace. Fig. 4 is a transverse vertical section taken on line 4, Fig. 1.

Similar letters of reference indicate corresponding parts.

A represents the boiler; B, the sides of the furnace; C, the bridge-wall; C', the back arch, and C'' the rear wall.

a is the fire-space.

D is a pipe leading from the external air to the vertical pipe E, which extends into the coupling F, leading into and uniting the oppositely-extending horizontal pipes H and H', which are connected by the couplings h and h' with the horizontal pipes K and K', which extend through the side B and into the bridge-wall C and back arch C', as indicated in Fig. 3. These pipes are located near the rear side of the bridge-wall and the front side of the back arch and are provided with a series of small jet-pipes or nozzles which extend through said walls into the furnace under the boiler. The nozzles or jet-pipes L extend from the pipe K through the rear surface of the bridge-wall and are set, preferably, at an upward angle, as indicated in Fig. 2. The nozzles or jet-pipes L' extend from the pipe K' through the front side of the back arch

and are preferably set at a downward angle, as indicated in the same figure. These angles are intended to point to the path of the gases through the combustion-chamber.

The lower end of the vertical pipe E (shown in Fig. 1 as broken out) is open, and extending vertically through such opening is the upturned nozzle or discharge end P' of a steam-pipe, which, with its necessary couplings, is lettered P. This pipe extends horizontally along the outer side of the wall B, thence vertically upward, and thence horizontally, connecting at P'' with the boiler, from which it takes steam. The damper b, Fig. 2, is connected by a suitable lever b' and chain b'' with a damper-regulator d, operated by an ordinary diaphragm in the case e, all substantially as illustrated in Figs. 1 and 4. This automatic damper-regulating device is common and needs no explanation. A suitable hand-regulator may be placed at S in the pipe P between the damper-regulator and nozzle.

The operation of the device is as follows: When the automatic damper-regulator is in such a position as to allow the steam from the boiler to pass through the pipe P, such steam is injected by the nozzle P' into the lower end of the pipe E, into which the air-pipe D opens, with the effect of drawing the air by a well-known principle from the pipe D into the pipe E and through the branching pipes H H' into the pipes K K', and through the small pipes L L' into the furnace next the upper part of the bridge-wall and the lower part of the back arch. Thus the air is injected into the flames and mingles with the gases in numerous small jets warmed by the steam from the pipe P. By means of these numerous small jets of warm air injected into the furnace at the most favorable points the air and gases mingle, with the effect of greatly aiding combustion.

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

1. In a steam-boiler furnace, a pipe leading from the external air through the masonry of the furnace; a plurality of small jet-pipes connecting said pipe with the combustion-chamber under the boiler at or near the bridge-wall; a steam-pipe connected with the

boiler and extending outside of the furnace to said air-pipe; a nozzle extending from said steam-pipe into the air-pipe; and a damper-regulator intermediate of the damper and the
5 steam-pipe, whereby a plurality of small jets of air are automatically forced into the combustion-chamber, substantially as set forth.

2. In a steam-boiler furnace, in combination, the boiler, and masonry provided with
10 the bridge-wall C and back arch C'; the pipes K, K' extending substantially horizontally into said bridge-wall and back arch; a plurality of small jet-pipes leading from said pipes K, K' into the combustion-chamber; the
15 pipes H, H' connected with the outer ends of

the pipes K, K'; the pipe E connected at its upper end with the pipes H, H' and with its lower end open; the feed-pipe D supplying said pipe E with external air; the pipe P provided with the nozzle P' extending into the
20 lower end of said pipe E, the opposite end of said pipe P connecting with the boiler; and means for regulating the injection of the steam into said pipe E, substantially as described.

EDWIN J. ELMS.

Witnesses:

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