(No Model.)

4 Sheets—Sheet 1.

E. J. C. KELLY.

BOILER FURNACE.

No. 343,128. Patented June 1, 1886.

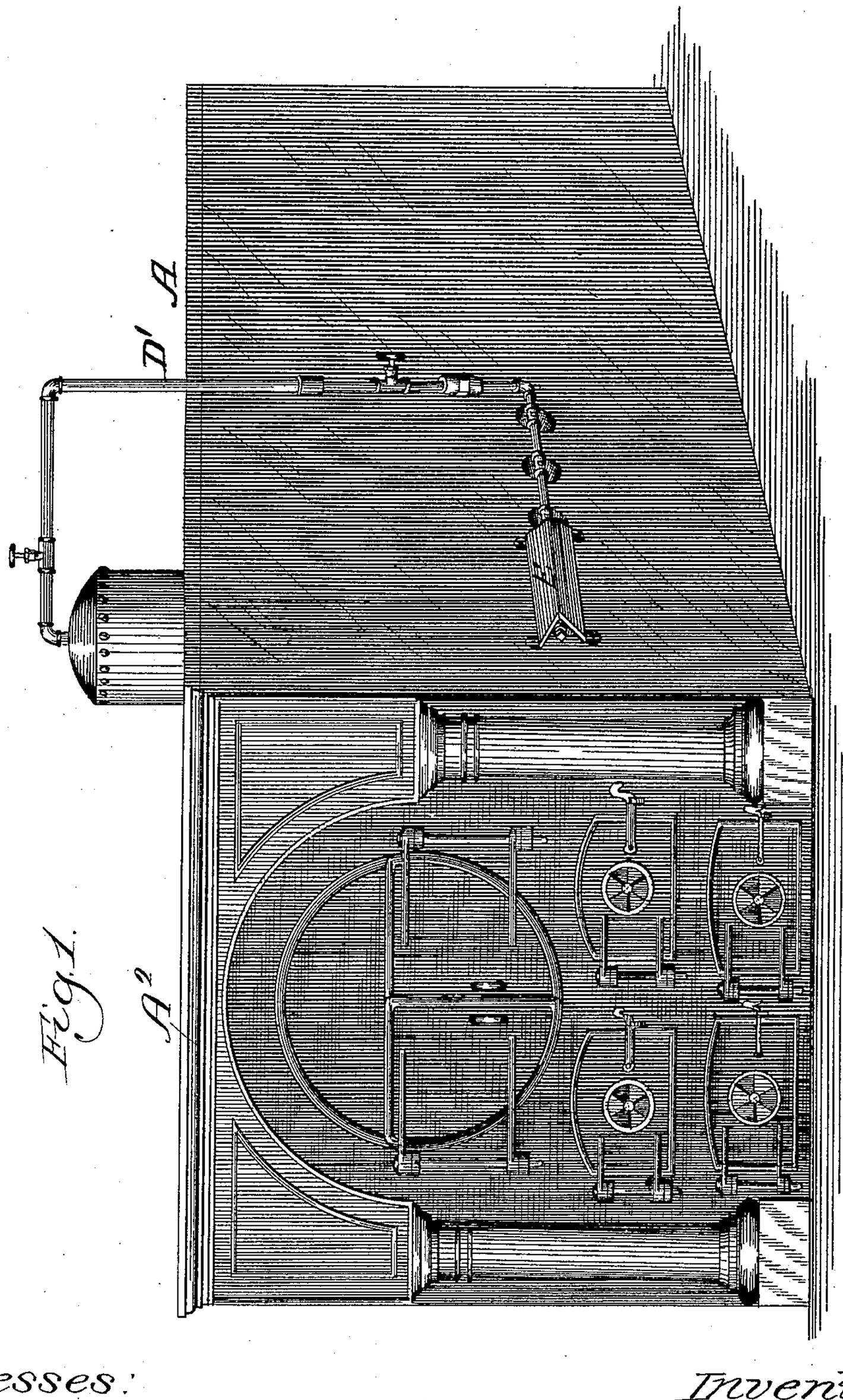


Fig. 1.

Witnesses:
Chas. E. Gaylord.
Mae C. Joslyn

Inventor:
E. J. C. Kelly.
By L. B. Copeland & Co
attys.

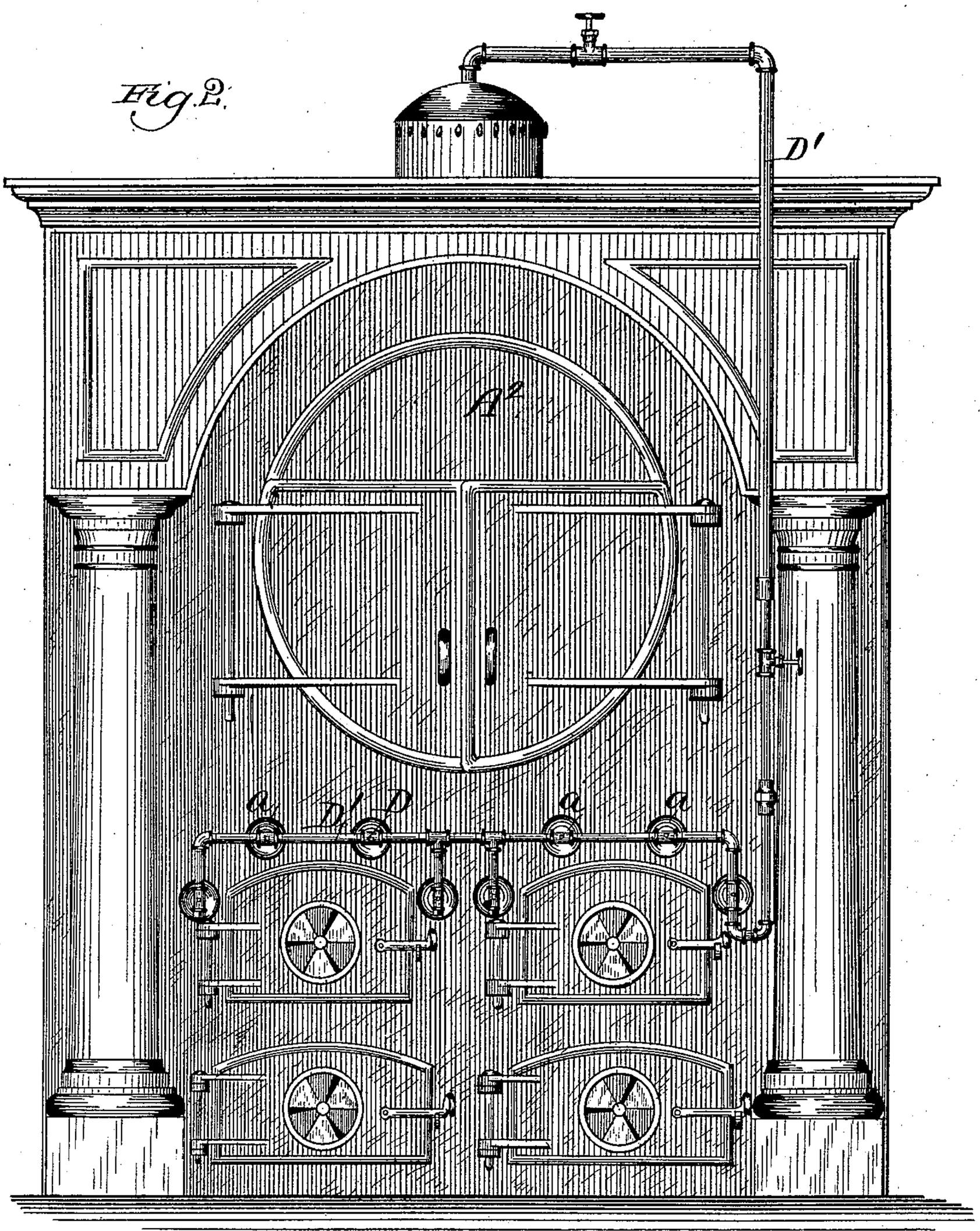
(No Model.) 4 Sheets—Sheet 2.

E. J. C. KELLY.

BOILER FURNACE.

No. 343,128. Patented June 1, 1886.

Fig. 2.



Witnesses:
Chas. E. Gaylord.
Mae C. Joslyn

Inventor:
E. J. C. Kelly.
By G. B. Coupland & Co
attys.

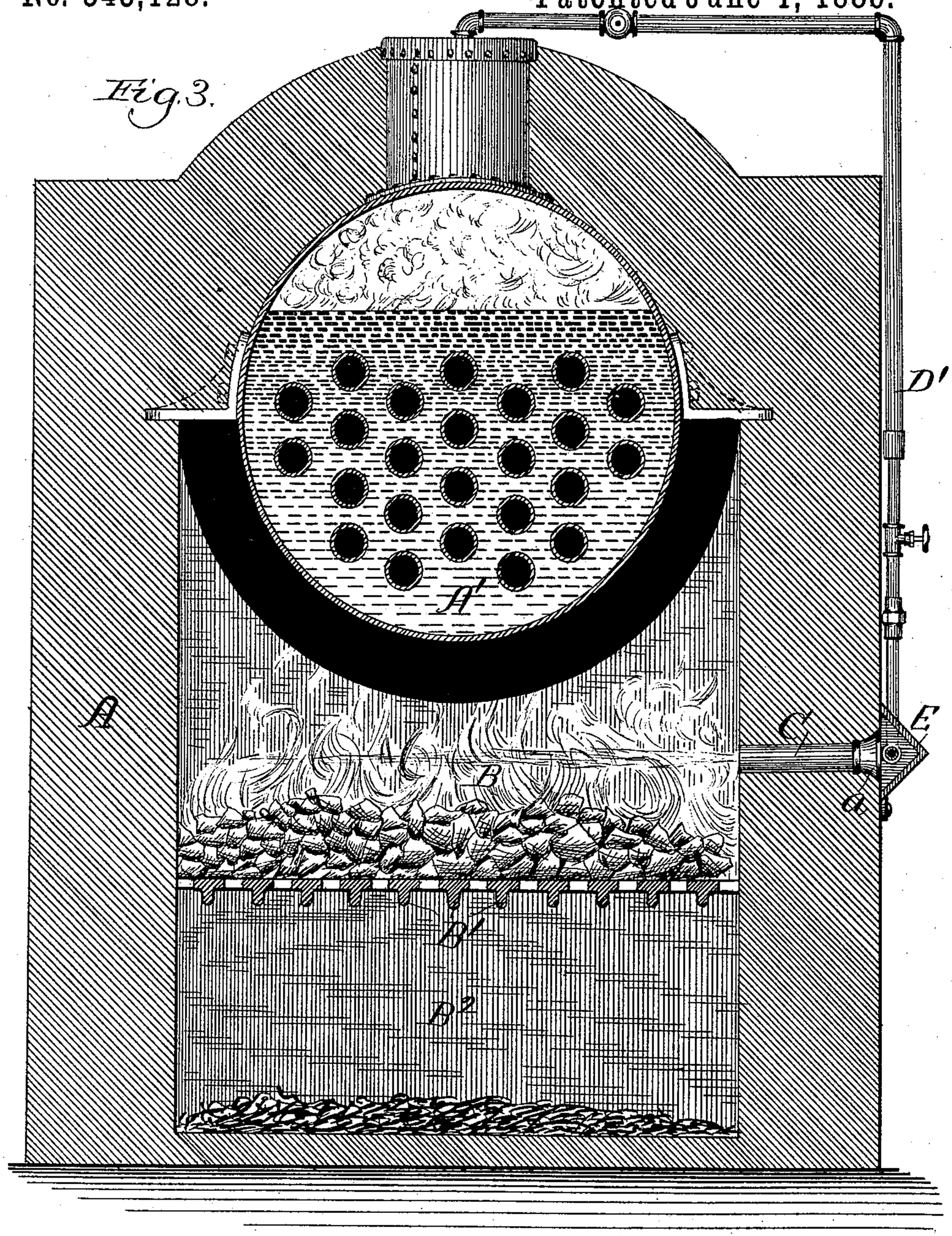
(No Model.) 4 Sheets—Sheet 3.

E. J. C. KELLY.

BOILER FURNACE.

No. 343,128. Patented June 1, 1886.

Fig. 3.



Witnesses!
Chas. E. Gaylord.
Mae C. Joslyn.

Inventor!
E. J. C. Kelly
By L. B. Coupland & Co.
attys.

(No Model.) 4 Sheets—Sheet 4.

E. J. C. KELLY.

BOILER FURNACE.

No. 343,128. Patented June 1, 1886.

Fig. 4.

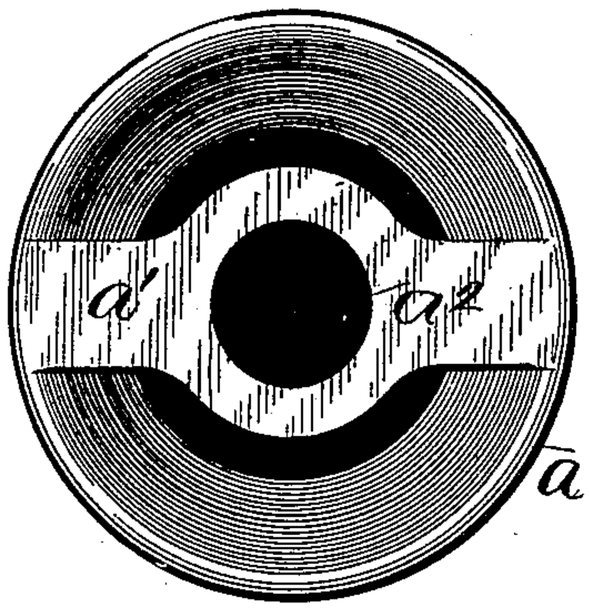


Fig. 5.

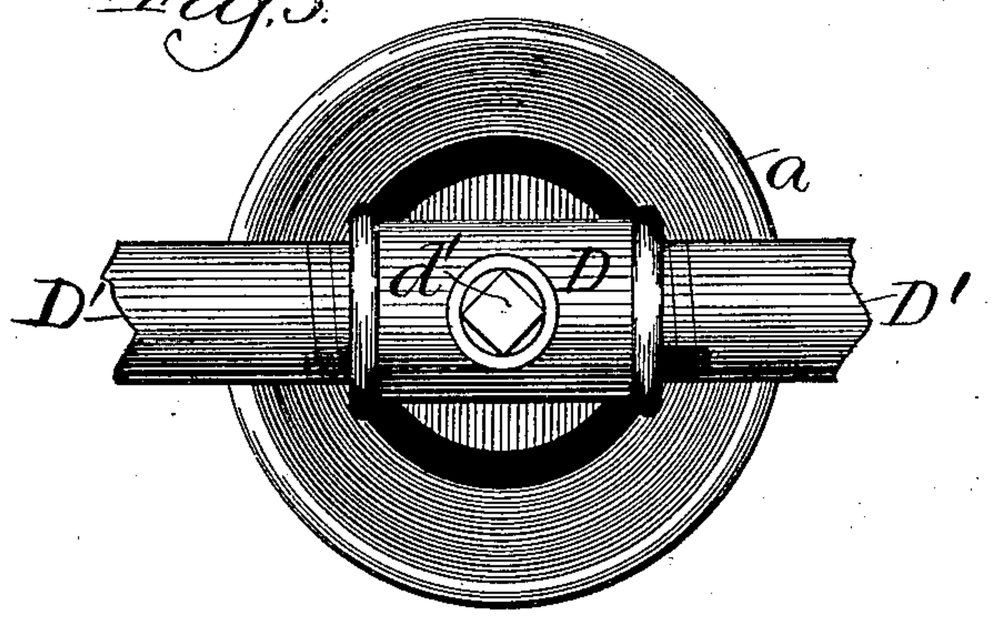


Fig. 6.

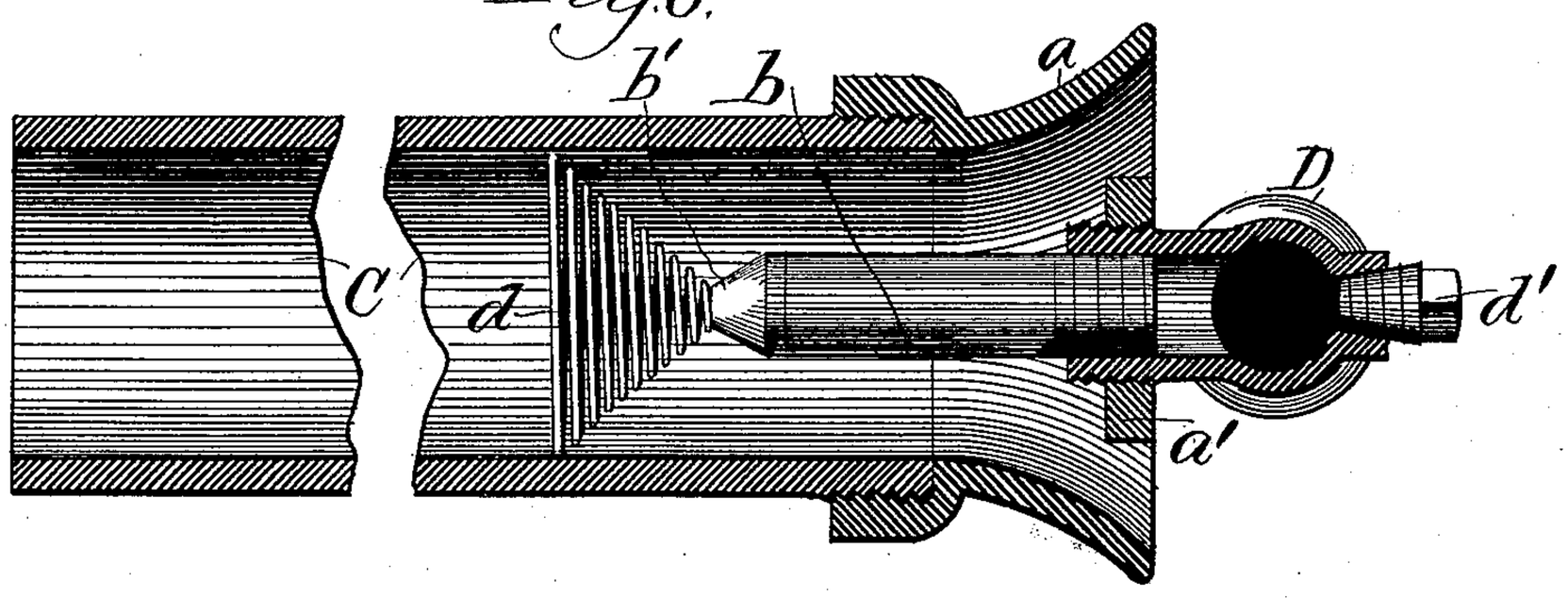
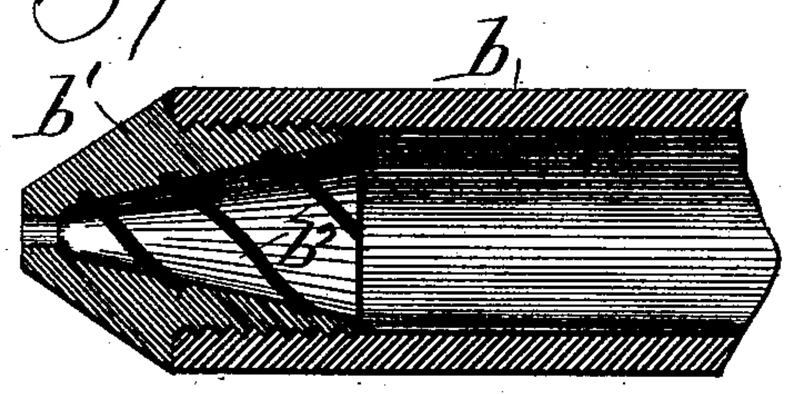


Fig. 7.



Witnesses:
Chas. E. Gaylord.
Mae E. Joslyn

Inventor:
E. J. C. Kelly.
By G. B. Copeland & Co
attys.

UNITED STATES PATENT OFFICE.

EDWARD J. C. KELLY, OF CHICAGO, ILLINOIS.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 343,128, dated June 1, 1886.

Application filed March 4, 1886. Serial No. 193,928. (No model.)

To all whom it may concern:

Be it known that I, EDWARD J. C. KELLY, of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Devices for the Prevention of Smoke in Boiler-Furnaces, of which the following is a full, clear, and exact description, that will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of this invention is to provide means for the prevention of smoke in boiler and other furnaces; and to this end it consists in the combination and arrangement of certain devices for the introduction of atmospheric air and steam and for properly commingling the same with the constituents of combustion, so as to produce a perfect combustion and prevent the formation of smoke.

Figure 1 is a view in perspective of a boiler-front and side wall embodying my improved features; Fig. 2, a front elevation; Fig. 3, a vertical transverse section, and Figs. 4, 5, 6, and 7 enlarged detached details.

Referring to the drawings, A represents the inclosing-walls; A′, the boiler; A^2, the boiler-front; B, the combustion-chamber; B′, the grate-bars, and B^2 the ash-pit.

Figs. 1 and 3 illustrate the application of my device through the side wall of the furnace. C represents one of a number of horizontal air-pipes, which may be inserted and arranged along the side of the furnace or inserted from the front, as shown in Figs. 1 and 2. These pipes are placed at stated intervals, and may be of any number best adapted to effect the desired result, and are located so as to discharge the commingled air and steam at a point above the fire, as shown in Fig. 3. The inner ends of the pipe C terminate flush with the wall, the opposite ends being provided with the flaring continuations or ends *a*, coming flush with the outer surface of the wall and having a threaded engagement with the body of the pipe or pipes C, as shown in Fig. 6. The object of these flaring ends is to increase the area at the receiving-point over that of the point of discharge, so that the body of the pipe C will always be full of air and a uniform pressure maintained therein. The bar *a′* extends across the mouth of the flaring end *a*, as shown in Fig. 4, and is provided with the central threaded aperture, a^2, for the insertion and engagement of the correspondingly exterior-threaded angle-branch of the T-coupling D, as shown in Fig. 6. *b* is a short steam-tube, the outer end of which is screwed into the angle branch of the T-coupling, while the inner end is provided with the nozzle *b′*, screwed into the same. The passage through this nozzle is gradually contracted to a small opening, and is provided on the inner surface with a spiral groove, b^2, so as to impart a twist to the volume of steam passing through the contracted passage and discharge the same with increased force. The steam-tube *b* extends but a little way into the body of the air-pipe, as shown in Fig. 6, in order to thoroughly mix the air and steam before the same is discharged into and mingled with the gases in the furnace. The conical wire coil *d* has the smaller part connected to the contracted end of the nozzle *b′*, and from thence gradually increases in diameter until the last and largest coil fills the inclosing-pipe. This coil, placed in the steam and air passage, has a vibrating action and serves to more thoroughly agitate and intermingle the gases.

Practical experimenting and working has clearly proved that the more thoroughly the oxygen of the air and the hydrogen of steam are mixed before entering the furnace the greater will be their affinity for mingling with the gases given out by the fuel, thus increasing the combustibility of all the gaseous elements as a volume.

d′ is a small screw-plug inserted in the T-coupling, which may be removed and a wire passed through the steam-tube, in order to clear out the contracted discharge-orifice in case the same should become stopped up.

D′ is a steam-pipe, which conducts the steam from the boiler to the different jets supplying the furnace.

The box or V-shaped cap E, open at one end, is placed over the steam and air inlets to deaden the sound created by the steam-jets, and to prevent the noise from passing out into the building.

The box or cap E may be made square, or any other desired shape

There has always been a great objection to the use of steam for promoting combustion, on account of the disagreeable noise incident to its

employment. By making use of a box or cap, as above described, this objection is greatly modified, if not entirely removed.

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

1. In a smoke-preventing device, the combination, with a combustion-chamber and one or more air-pipes communicating with said chamber and provided with an outer flaring end, of a short steam-tube placed on the inside of said pipe or pipes and terminating in a contracted conical discharge-end and a conical wire coil attached to said conical end or nozzle, substantially as and for the purpose set forth.

2. The combination, with the steam-tube *b*, of the nozzle *b'*, inserted in the inner end of said tube and provided on the interior contracted surface with the spiral groove b^2, substantially as and for the purpose set forth.

3. In a smoke-preventing device, the combination, with a steam-conducting pipe, of a steam-tube provided with a contracted discharge-passage having a spiral groove, a conical coil attached to the discharge end of said tube, an air-pipe inclosing said steam-tube, and the means described for supporting said tube in a central position with reference to the air-pipe, substantially as set forth.

4. In a smoke-preventing device, the combination, with the steam and air inlets, of a box or cap open at one end and adapted to cover said inlets and deaden the sound incident to the use of steam, substantially as set forth.

EDWARD J. C. KELLY.

Witnesses:
L. M. FREEMAN,
V. STANWOOD.