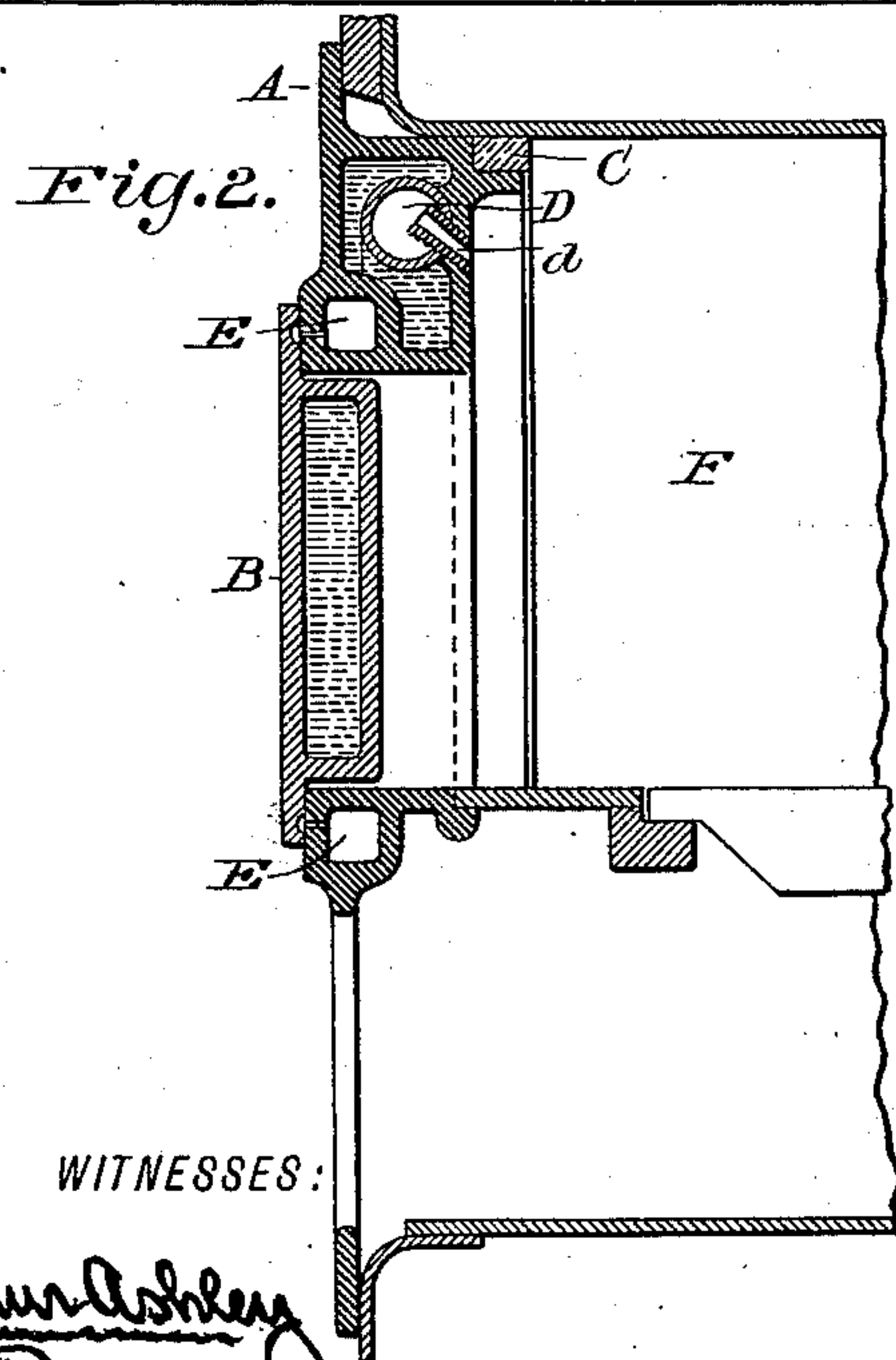
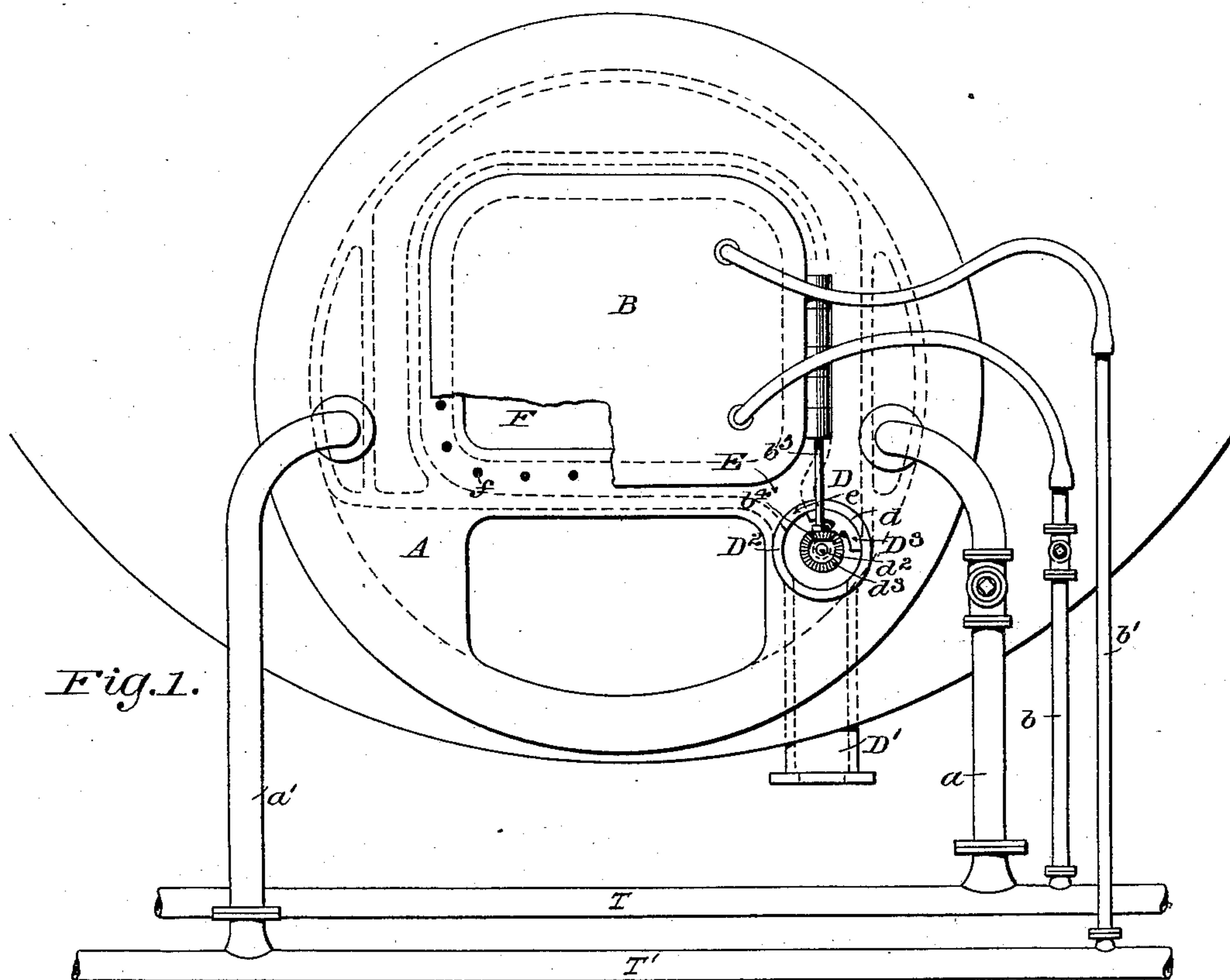


(No Model.)

J. P. SERVE.
FURNACE FRONT FOR STEAM BOILERS.

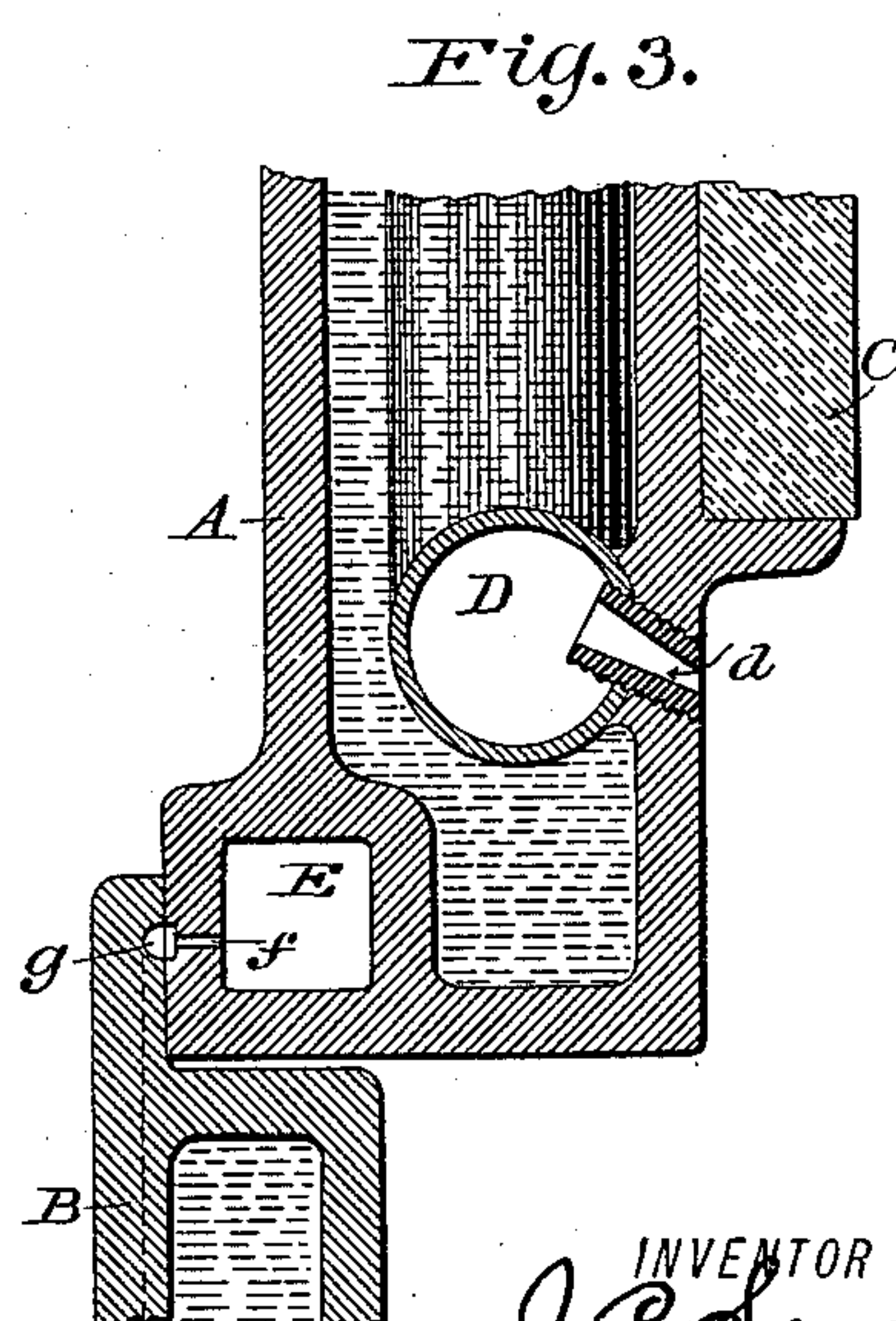
No. 562,493.

Patented June 23, 1896.



WITNESSES:

Arthur Ashley
J. F. Elmore,



INVENTOR

INVENTOR
J. P. Sewer
BY
P. J. Nalge
ATTORNEY.

UNITED STATES PATENT OFFICE.

JEAN PIERRE SERVE, OF PARIS, FRANCE.

FURNACE-FRONT FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 562,493, dated June 23, 1896.

Application filed July 10, 1894. Serial No. 517,058. (No model.)

To all whom it may concern:

Be it known that I, JEAN PIERRE SERVE, engineer, a citizen of the Republic of France, residing at Paris, in the said Republic of France, have invented certain new and useful Improvements in or Connected with Furnace-Fronts for Steam-Boilers, of which the following is a specification.

This invention relates to improvements in furnace-fronts for steam-boilers in which the furnace is fed with air under pressure with the object of obtaining an intense combustion, and consequently a more considerable production of steam than results from the ordinary chimney-draft.

It consists in means for preventing the excessive heating of the furnace-front plate, which inconveniences the stokers and raises to excess the temperature of the stoke-room; also for preventing dangerous flames coming to the outside when the charging-door is opened, and finally for preventing the escape of deleterious gases which are produced at the edges of the charging-door, and are distributed in the stoke-room.

The invention will now be described in detail with reference to the accompanying drawings, in which—

Figure 1 is a front view of the improved furnace-front; Fig. 2, a vertical section. Fig. 3 is a sectional view of a detail of the apparatus.

With the object of preventing the furnace-front plate A and the door B from being overheated in contact with the flames of the furnace F, I make these two parts hollow, as shown in Figs. 1 and 3, and I cause a current of cold water to circulate through them, which current constantly cools them.

In Fig. 1, *a* is the tube for supplying the water to the furnace-front plate. *a'* is the tube for carrying this water away. Similarly *b* is the tube for supplying the cold water to the door B, and *b'* is the tube for carrying it away. It is understood that these two tubes *b b'* are connected, by means of flexible pipes *b²*, with the general cold-water supply-main T and discharge-main T', in order not to impede the movements of the door B, the pipes *a a'* being also connected to the mains. Finally, C is a fireproof ring which protects the furnace-front plate A in case the circu-

lation of water should be momentarily interrupted.

In order to prevent, at the moment of opening the door B, any escape of flames to the outside, resulting from the pressure existing at this moment in the furnace, I arrange within the interior of the furnace-front plate A a tube D, Figs. 1, 2, and 3, following practically the shape of the door, which tube is provided with a slot or, preferably, with a suitable number of small tubes *d*, opening into the inside of the furnace F, and which are inclined in such a way as to converge at a certain distance behind the door B. This tube D is supplied with air by a pipe D', connected with the air-pressure pipe which feeds the furnace, a valve-casing D² being placed at the upper end of pipe D' and opening into tube D through a port *d*, controlled by a rotary segmental valve D³, mounted on the transverse valve-stem *d²*. The valve-stem is provided with a segmental pinion *d³*, with which meshes a pinion *b⁴* on the lower end of the hinge-pintle *b⁵*, which turns with the door B. The valve and its gear are so arranged that when the door is closed the valve D³ will close port *d* and when the door is opened the valve D³ will open said port. The apparatus being thus arranged, it is evident that the moment the door is opened the air forced in under pressure in convergent jets toward the rear of the furnace produces a kind of screen of air, which, by the direction of its various jets, prevents the flames or hot gases from coming out through the opening of the door, and tends, on the contrary, to convey into the furnace a certain quantity of external air, assisting the same result.

In the drawings the tube D, being almost entirely immersed in the water which serves for cooling the furnace-front plate A, cannot be affected by the heat of the furnace when, the door B being closed, the air blown in no longer enters this tube. The same is the case with the oblique tubes *d*, which have no projection on the inside of the furnace.

It is evident that the tube D, instead of being of wrought-iron, and partially inserted in the cast furnace-front plate A, might be cast on the inside of this door, or even be placed on the outside of the furnace. The oblique tubes *d* then would pass through the

double wall of the furnace-front plate A. Any suitable arrangement may be employed for the same object.

In order to prevent escapes of deleterious
 5 gases through the joint of the door B, which might take place owing to the existing pressure in the furnace, I arrange in the part of the furnace-front plate situated around this door a tube E, perforated with holes *f*, opening
 10 into a common external groove formed in front of the ledge of the door, and I arrange around this door a similar groove *g*, as may be seen clearly in Fig. 3. This tube E communicates with valve-casing D² through a
 15 port *e*, which is controlled by the valve D³. When the valve D³ is moved from port *d* by the opening of the door B, it will be moved over port *e* and close said port, and when said valve is moved away from port *e* by the closing
 20 of the door it will close port *d*. Thus air will be shut off from tube D when the door is closed and shut off from tube E when the door is open.

It is understood that the air arriving under
 25 pressure in the tube E tends to escape by the imperfect joint of the door B, so that a portion of this air penetrates into the furnace, while the other part escapes to the outside.

It is understood that any equivalent means
 30 may be employed for replacing, in the above-named manner, escapes of deleterious gases, which are actually produced at the edges of the door B by discharges of pure air, which do not constitute any inconvenience to the
 35 stokers.

I declare that what I claim is—

1. In combination with a boiler-furnace fed
 with air under pressure, a furnace-front plate
 cooled by an internal circulation of cold wa-
 40 ter and which is provided with a tube run-

ning around the edge of the opening of the furnace-door, the said tube being provided with small oblique convergent tubes or the like at a point situated on the inside of the furnace with the object of causing air to be
 45 blown under pressure into this furnace when the door is opened, substantially as hereinbefore described and for the purpose set forth.

2. In combination with a boiler-furnace fed
 with air under pressure, a furnace-front plate
 cooled by an internal circulation of cold wa-
 50 ter and which is provided with a tube surrounding the opening receiving the furnace-door, the said tube being perforated with holes opening into an external groove formed
 55 on the face of the ledge of the door with the object of causing an injection of air under pressure into the joint of the door when this door is closed, substantially as hereinbefore
 60 described and for the purpose set forth.

3. A furnace-front plate for a boiler, the
 upper part of which plate and of the door
 are cooled by an internal circulation of wa-
 65 ter, in combination with a tube for blowing air, said tube surrounding the opening of the door and having converging small tubes or the like and with a pipe for blowing air, said
 pipe surrounding the said opening and provided with holes opening opposite a groove
 70 formed on the internal periphery of the ledge of the door, substantially as hereinbefore described and for the object set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JEAN PIERRE SERVE.

Witnesses:

EUGÈNE DUMAS,
 JACQUES CONDOMY.