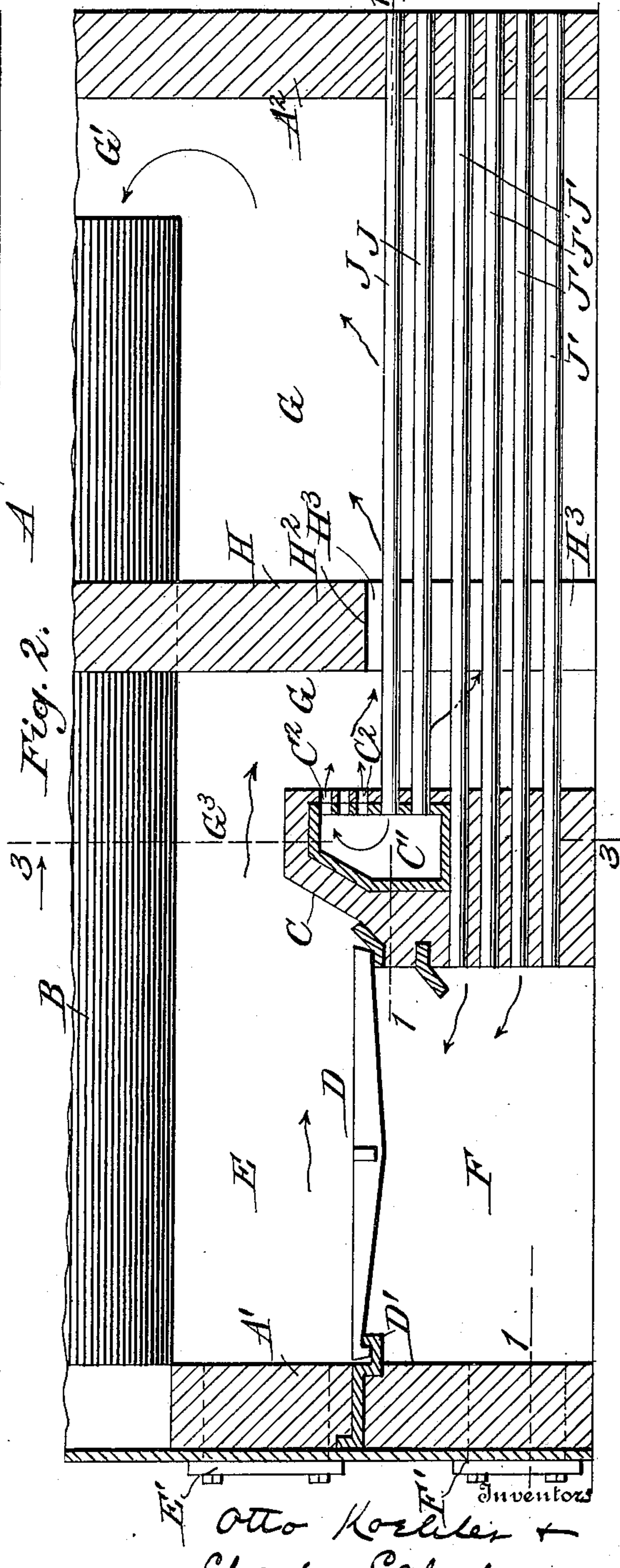
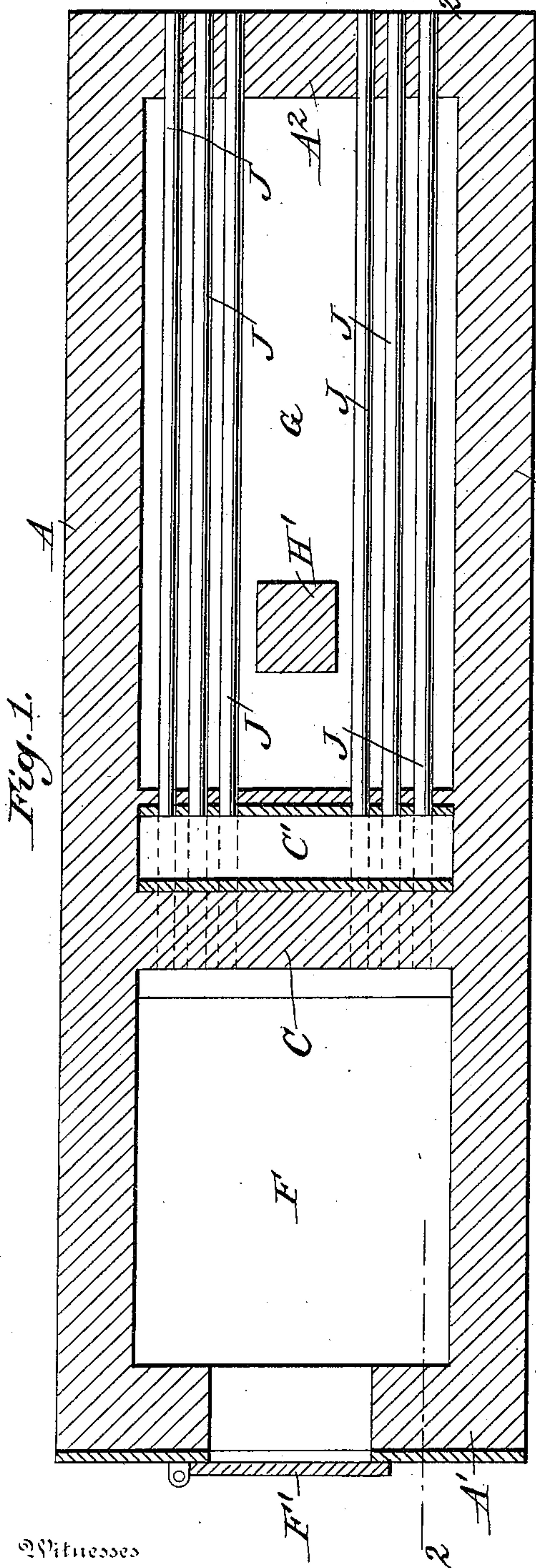


(No Model.)

2 Sheets—Sheet 1.



Witnesses
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No. 662,072.

Patented Nov. 20, 1900.

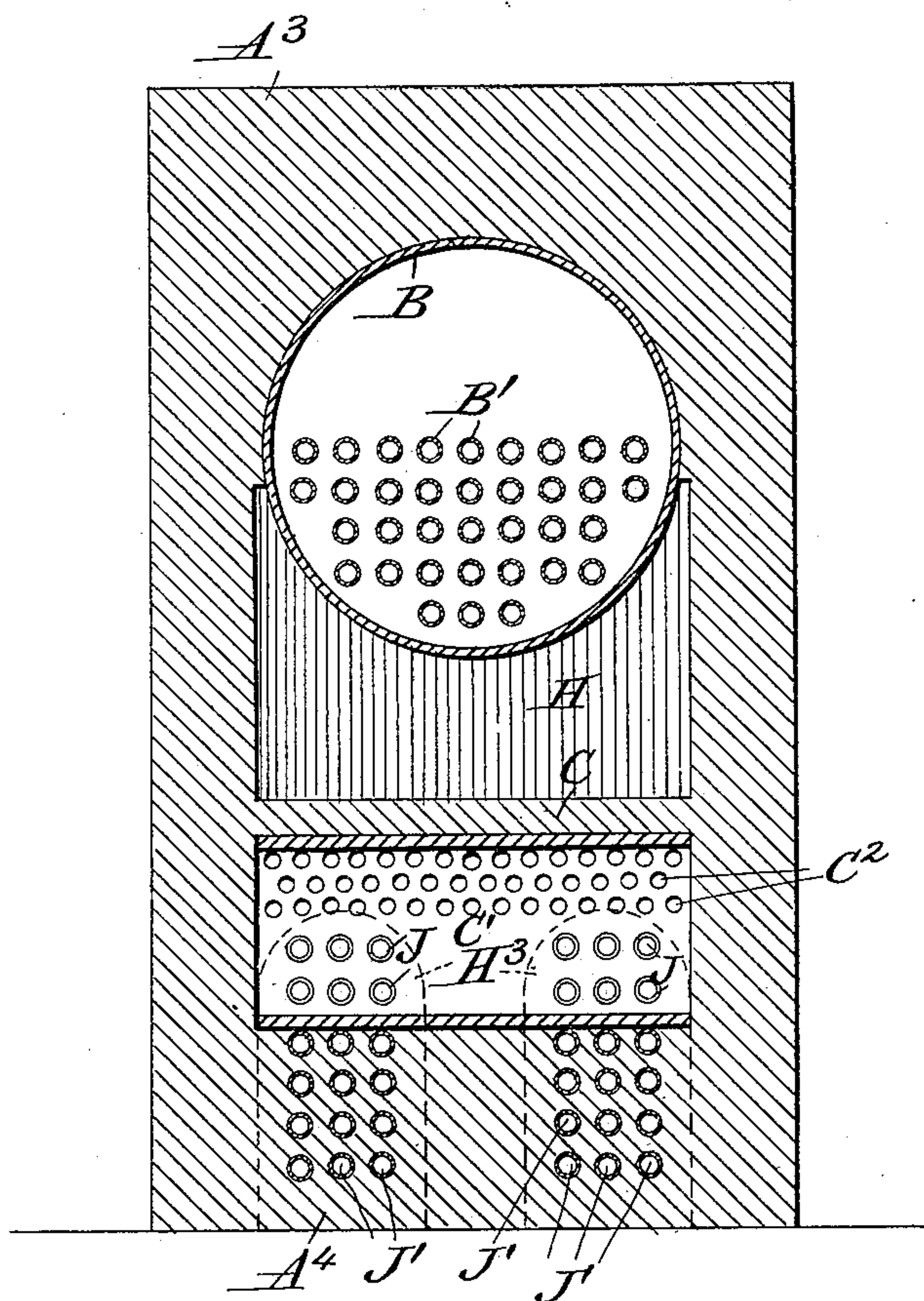
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FURNACE.

(Application filed June 16, 1899.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

OTTO KOEHLER AND CHARLES CALMBACH, OF SAN ANTONIO, TEXAS.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 662,072, dated November 20, 1900.

Application filed June 16, 1899. Serial No. 720,798¹ (No model.)

To all whom it may concern:

Be it known that we, OTTO KOEHLER and CHARLES CALMBACH, of San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Furnaces, of which the following is a full, clear, and exact description, such as will enable those skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The invention relates to improvements in furnaces of that class in which air is heated before it enters into the combustion by being passed through pipes located in the combustion-chamber.

It has for its object the production of such a device whereby the inflowing air is more highly heated and more thoroughly intermingled with the gases for combustion.

The invention consists in the novel construction, combination, and arrangement of parts, such as will be hereinafter fully described, pointed out in the appended claim, and illustrated in the accompanying drawings.

In the drawings, in which similar reference characters designate corresponding parts, Figure 1 is a horizontal sectional view of a furnace embodying the invention, the view being taken on the line 1 1 of Fig. 2. Fig. 2 is a longitudinal vertical sectional view on the line 2 2 of Fig. 1. Fig. 3 is a transverse vertical sectional view on the line 3 3 of Fig. 2.

The shell of the furnace may be of any construction suitable in the premises. In the present instance it consists of the side walls A, the front wall A', the rear wall A², the top A³, and the bottom A⁴, constructed in the usual manner. Mounted in the upper part of the shell is the boiler B, of the ordinary horizontal cylinder type, provided with the usual flue-tubes B'. In the space in the shell beneath the boiler and somewhat nearer to the front wall A' than to the rear wall A² is located the bridge-wall C. The latter extends transversely across the shell from one side wall to the other. In its upper part is a chamber C', extending through its entire length. From the upper part of the chamber openings C² lead through the rear side of the bridge-wall.

Grate-bars D are supported at their front

ends on the bracket D', secured in the front wall of the shell, and at their rear ends by the bridge-wall C. Above the grate-bars and in front of the bridge-wall is the primary combustion-chamber E, into which fuel may be introduced through the door E', placed in the front wall of the shell. Beneath the grate-bars is the ash-pit F, from which ashes may be removed through the door F', also in the front wall of the shell.

Between the bridge-wall and the rear wall of the shell is the secondary combustion-chamber G, communicating with the flue-tubes B' of the boiler by the back connection G'. It is connected with the primary combustion-chamber E by the passage G³, leading over the bridge-wall and beneath the boiler.

In the upper part of the secondary combustion-chamber, a short distance to the rear of the bridge-wall, is the baffle-wall H, contacting with the under side of the boiler and supported on the pier H'. This baffle-wall divides the upper part of the secondary combustion-chamber into two parts, and its lower edge, as at H², extends considerably below the upper edge of the bridge-wall. Between the pier H' and the side walls of the shell are passages H³, connecting the two parts of the secondary combustion-chamber.

A series of pipes J J' lead from the exterior of the shell through the rear wall A² and through the passages H³ beneath the baffle-wall to the bridge-wall. A portion of the pipes, as J, open into the chamber C' in the bridge-wall, and the other portion of the pipes, as J', pass through the lower part of the bridge-wall and open into the ash-pit F beneath the grate-bars.

The operation of the furnace will now be described. The fire is started in the usual manner in the primary combustion-chamber. The doors E' and F' are closed to prevent the ingress of the cold air outside of the furnace. The heat generated by the combustion of the fuel creates a draft that draws the air through the pipes J J' from the exterior of the furnace. The air introduced by the pipes J into the ash-pit passes directly to the fuel on the grate-bars and enters into the combustion. The gases produced by the burning of the fuel leave the primary combustion-chamber and pass through the passages G³ into the

secondary combustion-chamber G. On entering the latter chamber the gases strike against the baffle-wall H and are deflected toward the bottom of the secondary combustion-chamber. The air that enters through the pipes J⁸ into the chamber C' in the bridge-wall passes through the openings C² and mixes with the gases deflected by the baffle-wall. The air and gases deflected by the baffle-wall toward the bottom of the secondary combustion-chamber strike against and pass between the pipes J J', and thereby are more thoroughly intermingled for secondary combustion. The heated air and gases deflected directly upon the pipes heat them to a high degree, and consequently the air flowing through them is more highly heated before it enters into the combustion. The products of combustion finally pass through the back connection G' to the flue-tubes B' of the boiler.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

A furnace having a bridge-wall formed with a chamber therein, the chamber having open-

ings in its rear side, a baffle-wall built in the furnace beneath the boiler and rearward of the bridge-wall, the baffle-wall having a pier supporting it above the bottom of the furnace and the baffle-wall extending up into contact with the boiler, and a series of pipes communicating with and extending from the atmosphere and passing through the rear wall of the furnace forwardly beneath the baffle-wall on each side of the pier and into the bridge-wall, a portion of such pipes communicating with the chamber therein and the other of the pipes passing through the bridge-wall and discharging at the front thereof beneath the grate, said pipes being arranged in the path of the air from the bridge-wall and the gases from the combustion-chamber, whereby said air and gases are more thoroughly intermingled for secondary combustion, and the inflowing air is more highly heated.

OTTO KOEHLER.

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