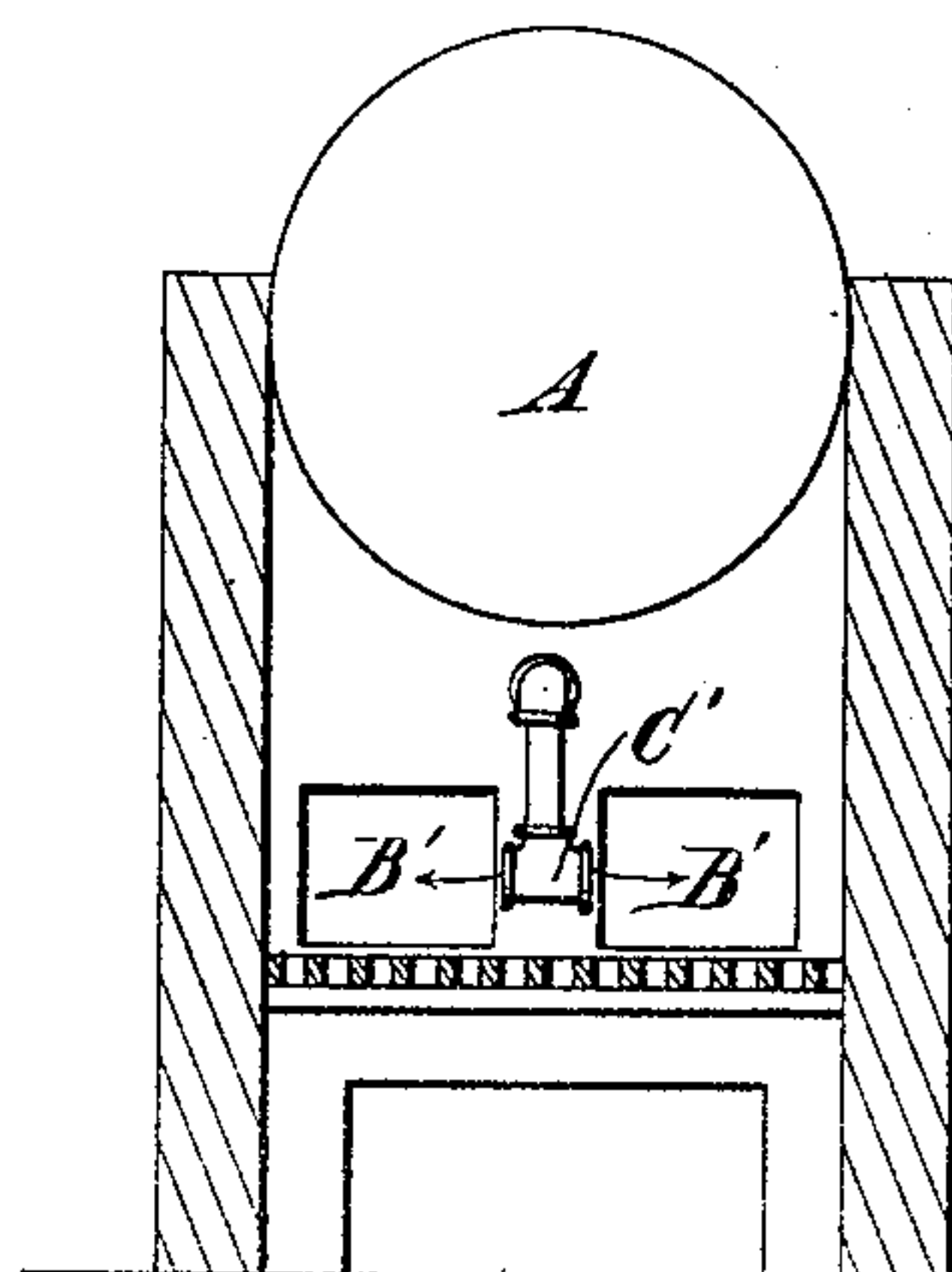
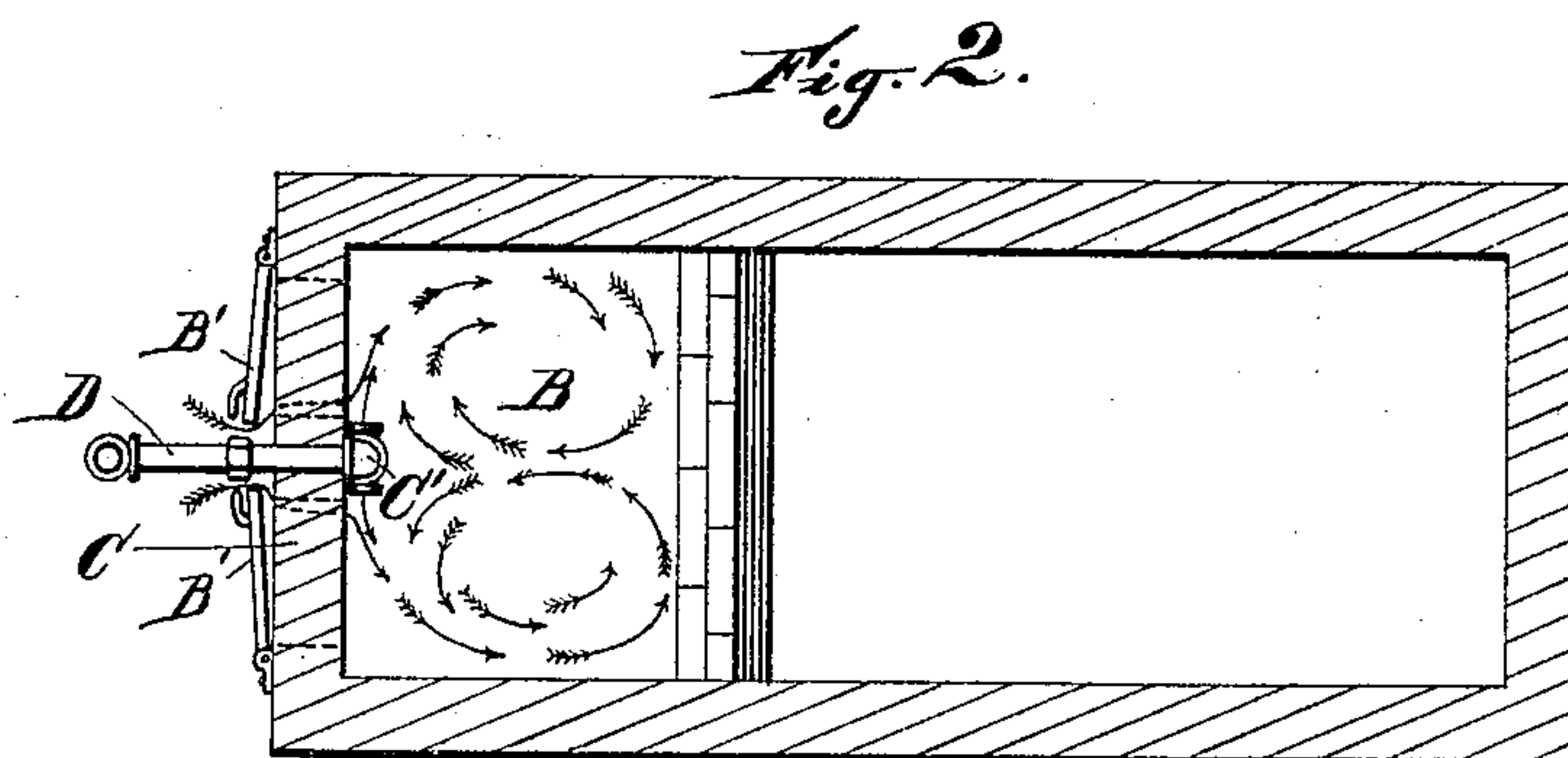
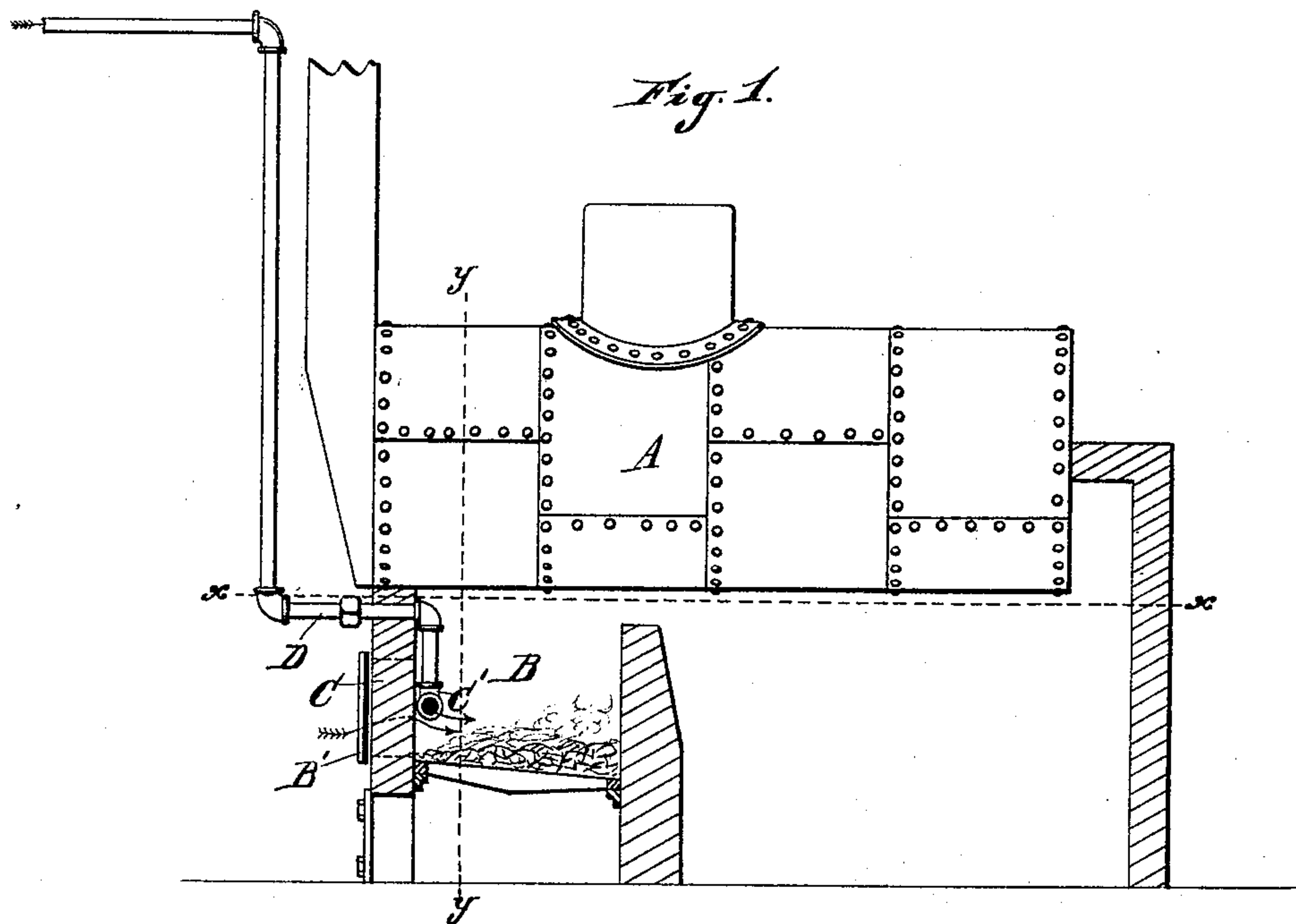


(No Model.)

D. L. OSBORNE.
SMOKELESS FURNACE.

No. 390,798.

Patented Oct. 9, 1888.



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DAVID L. OSBORNE, OF DETROIT, MICHIGAN.

SMOKELESS FURNACE.

SPECIFICATION forming part of Letters Patent No. 390,798, dated October 9, 1888.

Application filed February 17, 1888. Serial No. 264,334. (No model.)

To all whom it may concern:

Be it known that I, DAVID L. OSBORNE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have
5 invented a certain new and useful Improvement in Smokeless Furnaces; and I declare the following to be a full, clear, and exact description of the invention, such as will enable
10 others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists of the combinations of devices and appliances hereinafter specified,
15 and more particularly pointed out in the claim.

In the drawings, Figure 1 is a view, partly in section and partly in elevation, of a steam-boiler and its furnace embodying my invention. Fig. 2 is a horizontal sectional view
20 through the furnace. Fig. 3 represents a section by a vertical plane and looking forward toward the interior of the furnace-front.

It is the purpose of my invention to produce an attachment for a furnace whereby it is rendered smokeless.
25

My invention consists more particularly in the provision of an inlet-pipe leading through the front of the furnace and down about mid-way to the bottom of the feeding-doors. It is
30 here provided with a T or with two short branches leading out to the side, by which the draft of air through the pipe is here caused to separate and is thrown off to the right and left, and, in connection with this arrangement
35 of an air-pipe, the draft through the draft-openings of the door or through the partially-opened doors is caused to eddy within the combustion-chamber and to mix with and effect a thorough combustion, and so destroy or prevent smoke.
40

In carrying out my invention, A represents an ordinary steam-boiler. B is its combustion-chamber. C is the furnace-front.

D is an air-pipe, which leads in from the
45 outside and passes through the furnace-front, and is brought down within the furnace to a position about half-way to the bottom of the furnace-doors, and is at this point provided with a T, C', or is in any convenient way terminated so as to discharge the air at this point
50 both to the right and left. This would be the

preferable arrangement where, as shown in the drawings, the furnace is provided with two feeding-doors. If, however, the furnace is provided with but a single feeding-door, then the
55 pipe C may be brought in either above the furnace-door or below the furnace-door, so as to locate the T either just above or just below the door.

B' represents the furnace doors. They are, 60 as shown in Fig. 2, preferably left a little open, so as to permit air to enter freely around the edges; but, instead of leaving the door thus slightly open, the doors may be provided with draft-openings, through which the air may be
65 introduced.

The operation of this device is as follows: Air entering through the pipe D is discharged through the T C' to the right and left, as shown by the arrows in Fig. 2. At the same time air
70 passing in through the draft-opening of the door, or through the open doors themselves, is deflected to the right and left by the draft which enters through the pipe D. This causes the air to be eddied within the combustion-
75 chamber, and so effects a thorough combustion of the unconsumed products which rise from the bed of fuel.

I have found, after a continued practical use of the invention for a considerable period, that
80 there is produced by the arrangement a thorough and complete smokeless furnace.

I am aware that it is not new to introduce air and steam, or a mixture of air and steam, into the combustion-chamber above the bed of
85 incandescent fuel, and that various means have been employed for this purpose; but I know of nothing that accomplishes the entire purpose in so simple and inexpensive a form as that which I here produce, nor one which is so
90 readily adapted for attachment to any of the ordinary furnaces in use.

It will be understood that this device is equally well adapted for boilers of a locomotive type, in which a water-leg surrounds the fur-
95 nace, it being necessary in this case simply to locate a thimble through the water-chamber at the front of the furnace, and through which thimble the air-pipe is passed. The air-pipe may be terminated just outside of the boiler,
100 so as to adapt the device for ready connection to an inlet-pipe that may lead to it from the ex-

terior of the boiler-room, or it may be left open at this point and take its air directly from the boiler-room. I prefer, however, usually to lead the supply-pipe to the exterior air, since
5 by so doing the result appears to be more perfectly accomplished, possibly due to the fact that it is less rarefied by it, and consequently a given volume drawn in by the draft will supply a larger percentage of oxygen to the pro-
10 ducts of combustion.

What I claim is—

A smoke-consuming attachment for a furnace, the same consisting of an air-pipe entering through the furnace-front above the doors

and brought down between said doors closely adjacent to the front walls and terminating in a T or equivalent midway between the top and bottom of said doors, whereby the air entering through the pipe, immediately upon its issue, operates to deflect and become mixed
15 with the air entering through the doors, substantially as described. 20

In testimony whereof I sign this specification in the presence of two witnesses.

DAVID L. OSBORNE.

Witnesses:

M. B. O'DOHERTY,
SAMUEL E. THOMAS.