

No. 626,465.

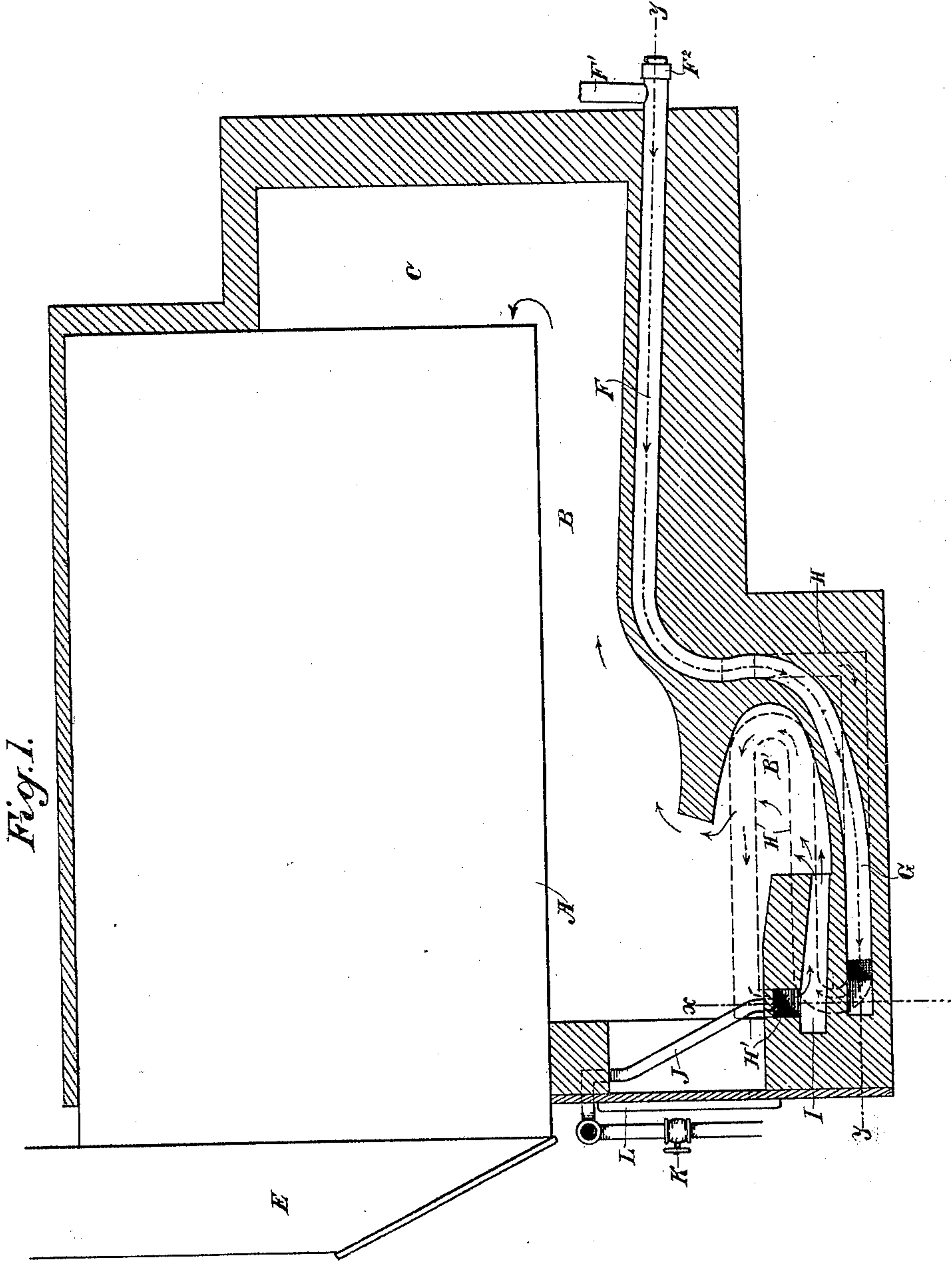
Patented June 6, 1899.

A. JOHNSON.
HEATING FURNACE.

(Application filed June 2, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses,

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Fig. 2.

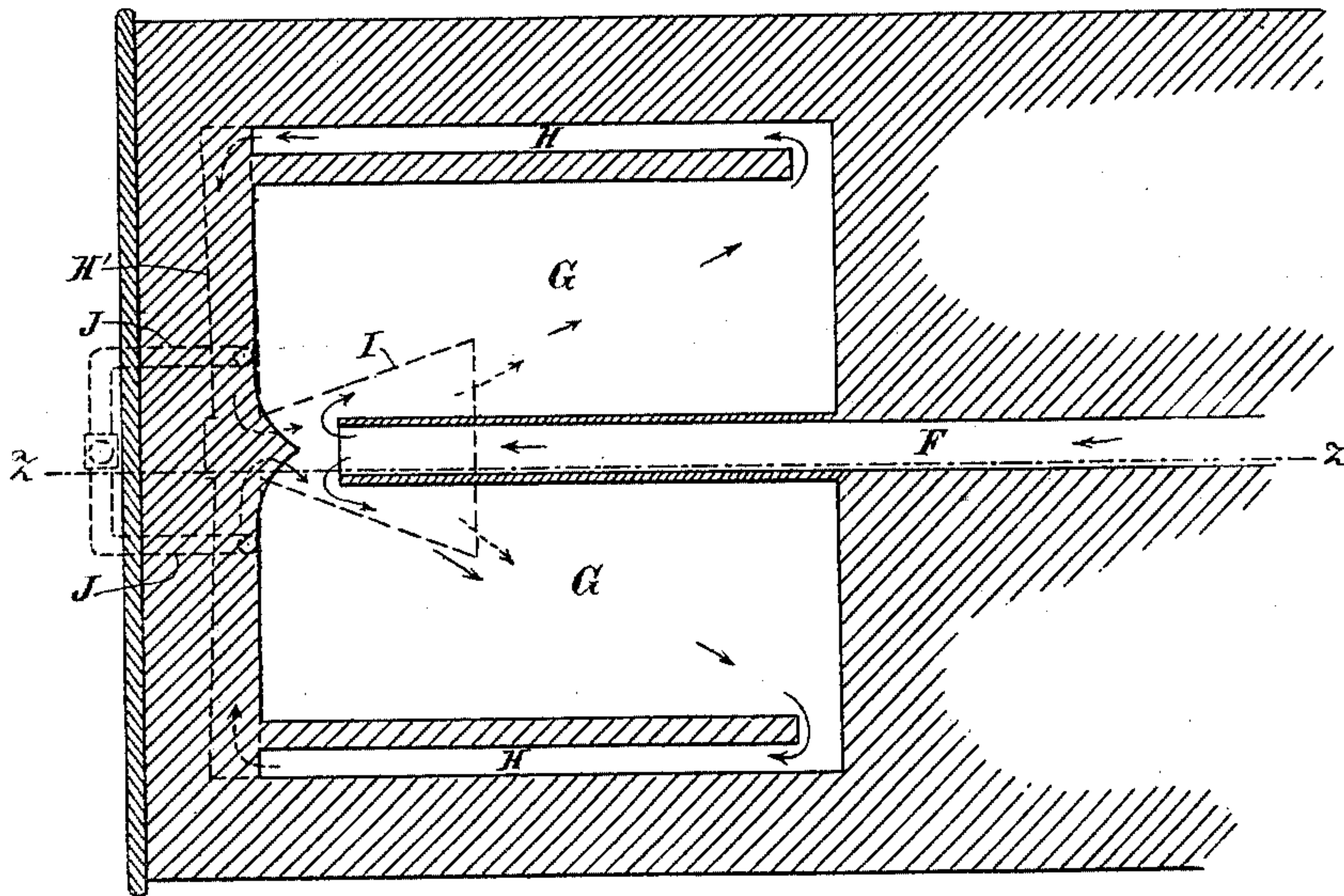
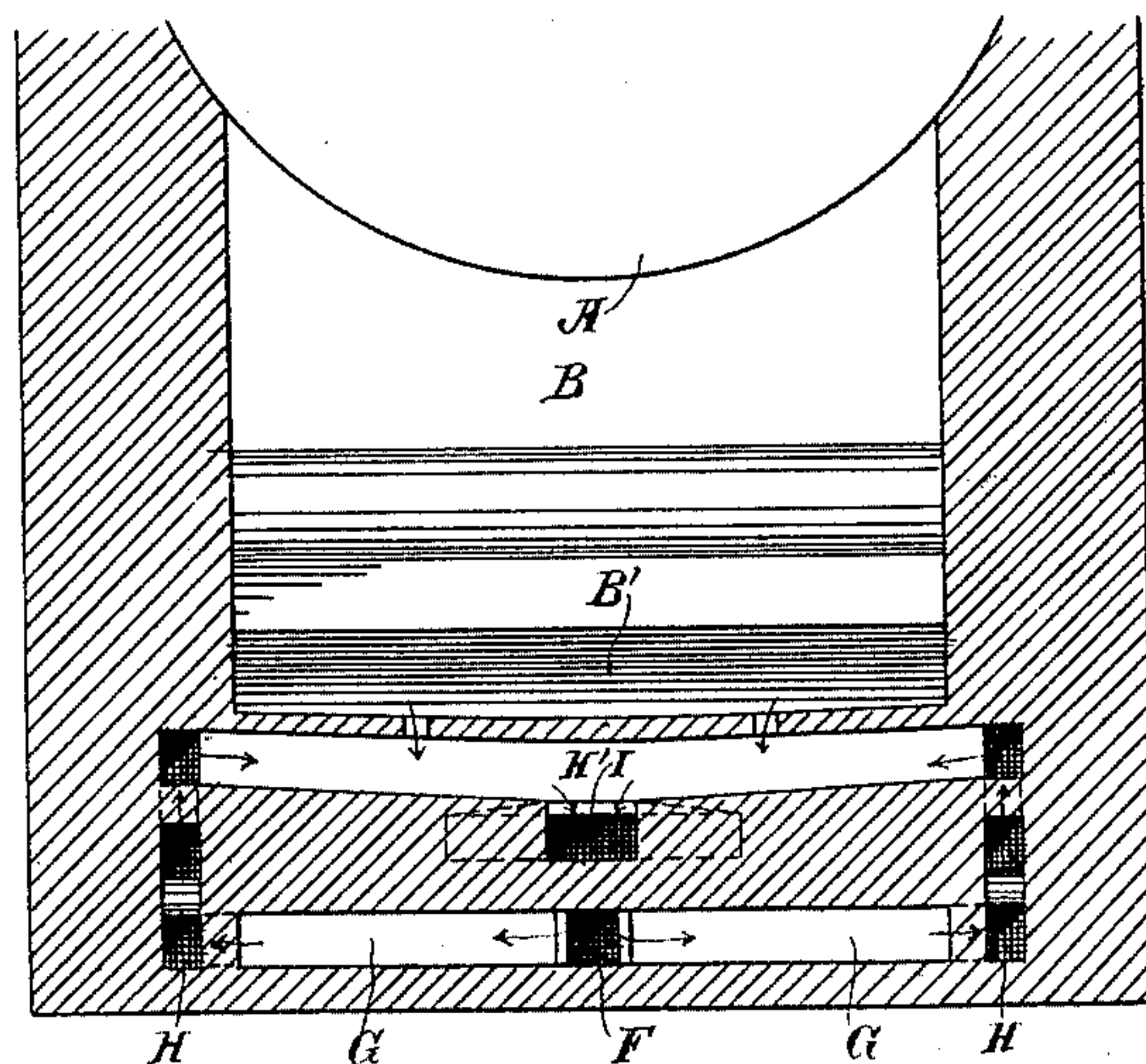


Fig. 3.



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UNITED STATES PATENT OFFICE.

AUGUST JOHNSON, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE OIL-FUEL SAVING COMPANY, OF SAME PLACE.

HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 626,465, dated June 6, 1899.

Application filed June 2, 1898. Serial No. 682,327. (No model.)

To all whom it may concern:

Be it known that I, AUGUST JOHNSON, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Heating-Furnaces; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improvement in heating-furnaces.

It is especially designed to be used in conjunction with furnaces where heat is required either for making steam, as in boiler-furnaces, for roasting or smelting ores, or it may be used in any relation where heat and perfect combustion are required.

It consists of the parts and the constructions and combinations of parts hereinafter described and claimed.

Figure 1 is a longitudinal vertical section on line Z Z, Fig. 2, showing the application of my invention to a boiler-furnace. Fig. 2 is a longitudinal horizontal section on line Y Y, Fig. 1, also showing the passages H in section. Fig. 3 is a vertical transverse section on line X X, Fig. 1.

The object of my invention is to provide a means for heating air which is to be used for combustion to a higher temperature and then introducing it, in conjunction with a liquid fuel, into a combustion-chamber of peculiar form, wherein an intimate mixture takes place and a very perfect combustion. The furnace thus constructed may be employed wherever a high degree of heat and perfect combustion are required. I have here shown it in conjunction with a steam-boiler A of any suitable or desired description. In the present case I have shown a fire-box or combustion-chamber B beneath the boiler, through which the products of combustion pass to the rear combustion-chamber C, thence returning through flues to the smoke-stack E at the front of the boiler; but the apparatus is equally well fitted to be used in conjunction with other forms of boilers or with other forms of heating apparatus.

F is an air-pipe which I have here shown extending into the lower part of the chamber B from the rear of the boiler-setting, and this passage has at the outer end a branch pipe

F', through which a blast may be furnished when desired from any suitable air-forcing mechanism.

At F² is an opening with a controlling-valve which may be opened to admit air for natural draft when the force-draft is out of use, so that either may be used at will. The air passing in or through the passage F enters a broad flattened chamber G beneath the fire-box, into which the pipe passes with a downward curvature, as shown, so as to deliver the air into this chamber near the front and lower portion. From this point the air distributes through the chamber, rising toward the rear, where it enters the pipes or passages H at each side of the chamber and within the walls of the fire-box, so as to be exposed to a high temperature therein. Within these walls the pipes H follow a sinuous or serpentine course, as shown, and finally terminate in a transverse passage H', with the opposite ends of which these pipes H connect, and this passage inclines from these exterior pipes toward the center, as shown. At this point it connects with a discharge-pipe I, through which the blast is directed into the furnace.

J are pipes or passages leading downwardly at an incline, as here shown, and opening into the transverse air-passage H' at a point upon each side of the discharge-tube I, which is situated below the pipe H'. These pipes J J serve to convey a liquid fuel, which is preferably some form of petroleum product, such as crude petroleum, and this is brought through a suitable conducting-pipe having a controlling cock or valve K, so that the supply through the pipes J may be regulated at will. The oil thus delivered encounters the highly-heated air in the pipe H and its temperature is at once raised, so that the oil may be vaporized and passed out through the pipe I. The blast of air is sufficient to carry the oil along with it through the pipe I, from the mouth of which it discharges into the combustion-chamber B'. This combustion-chamber is a peculiarly-curved chamber, the base or bottom of which inclines upwardly and rearwardly from the mouth of the discharge-pipe I and returns upon itself in a curvature resembling that of a parabola. The jet of air and oil delivered into this chamber are in-

timately mixed and by a reverberatory action produced therein are discharged into the main body of the furnace B, passing thence rearwardly into the rear combustion-chamber C, thence to the smoke-stack, as previously described.

When the apparatus is in full working order, an intense heat is produced in the combustion-chamber B', the result of which, in conjunction with the supply of highly-heated air and oil, is to produce a thorough and perfect combustion with little or no smoke, the heat being particularly well adapted for use in boiler-furnaces as well as for other purposes where a perfect combustion and little deposit of carbon or other foreign substances are desired.

The furnace is provided with doors L, which remain closed while the furnace is in operation, but which may be opened when it is desired to first commence operations, so that a small quantity of any ordinary fuel can be introduced either upon a temporary or permanent grate or directly upon the masonry setting above the tube I, so that the parts may be heated, or, if desired, steam can be raised in the boiler sufficient to operate the air-forcing mechanism to provide for a forcedraft. If the forcedraft is not required, the heat will be sufficient to heat the air and the oil, so that operations can be commenced with a natural draft, after which no further fire of this description will be needed.

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

1. A heating-furnace comprising a main combustion-chamber, a communicating primary combustion-chamber below the front portion thereof, a discharge-pipe, an oil-supply, air-supply pipes, and a transverse pipe connecting at its opposite portions with the air-pipes and at intermediate points with the discharge-pipe and oil-supply.

2. In a heating-furnace, a main combustion-chamber, a primary combustion-chamber situated below the front portion of the main chamber, having a curved rearend with the upper portion diverging upwardly so as to discharge into the main chamber, a discharge pipe or passage opening in line with the lower part of the primary chamber, air-heating pipes situated in the walls of the furnace, a transverse pipe connecting at its opposite ends with the air-pipes and having its intermediate portion connecting with the discharge-pipe, and oil-supply pipes discharging into said transverse pipe so that oil and air are mixed and delivered together into the discharge-pipe.

3. In a heating-furnace, a main combustion-chamber, a primary chamber situated below and connecting with the rear portion of the main chamber, a curved chamber formed beneath the floor of the primary combustion-chamber and having a corresponding curvature, and air-pipes leading from the rear portion of the furnace beneath the floor of the main combustion-chamber following the curvature and discharging into the front portion of the flattened chamber, air-pipes leading out of the opposite sides of the rear part of said chamber and following a sinuous course within the side walls of the furnace proper, said pipes uniting in a common transverse pipe or chamber, oil-pipes connecting with said chamber, and a discharge pipe or passage situated below the chamber so as to receive the oil and air therefrom and direct the mixture into the primary combustion-chamber.

In witness whereof I have hereunto set my hand:

AUGUST JOHNSON.

Witnesses:

S. H. NOURSE,
H. F. ASCHECK.