

No. 886,050.

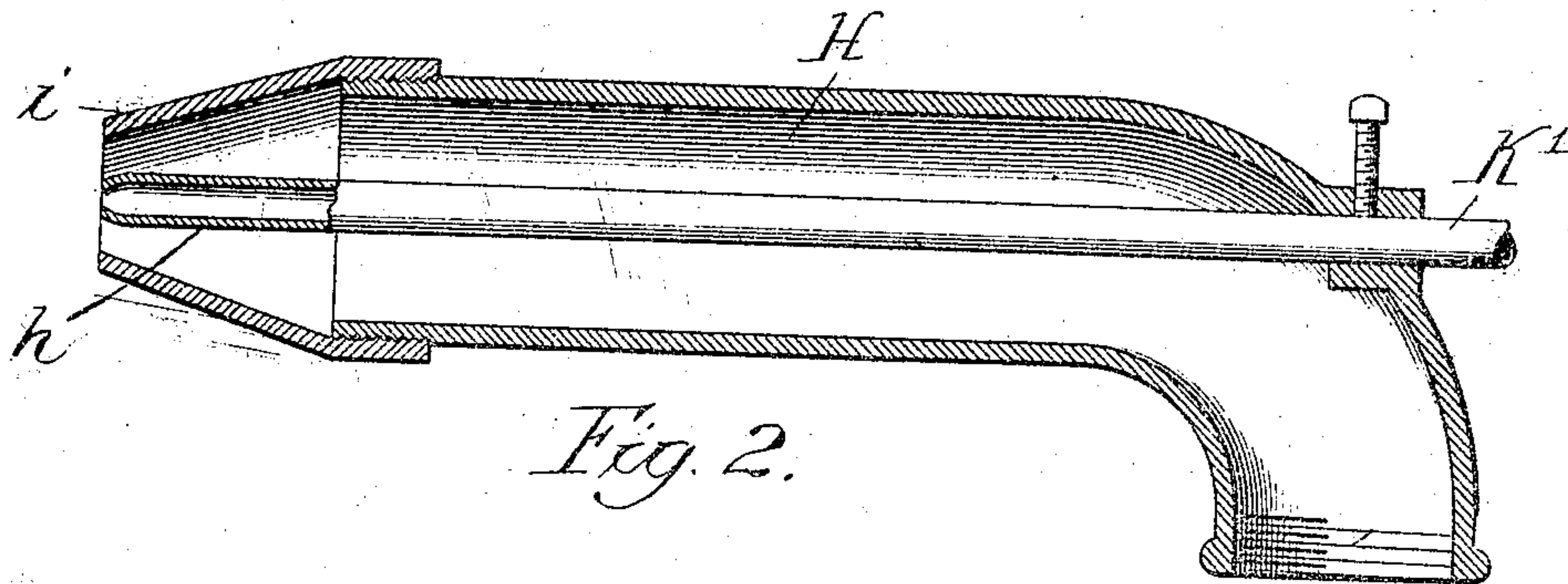
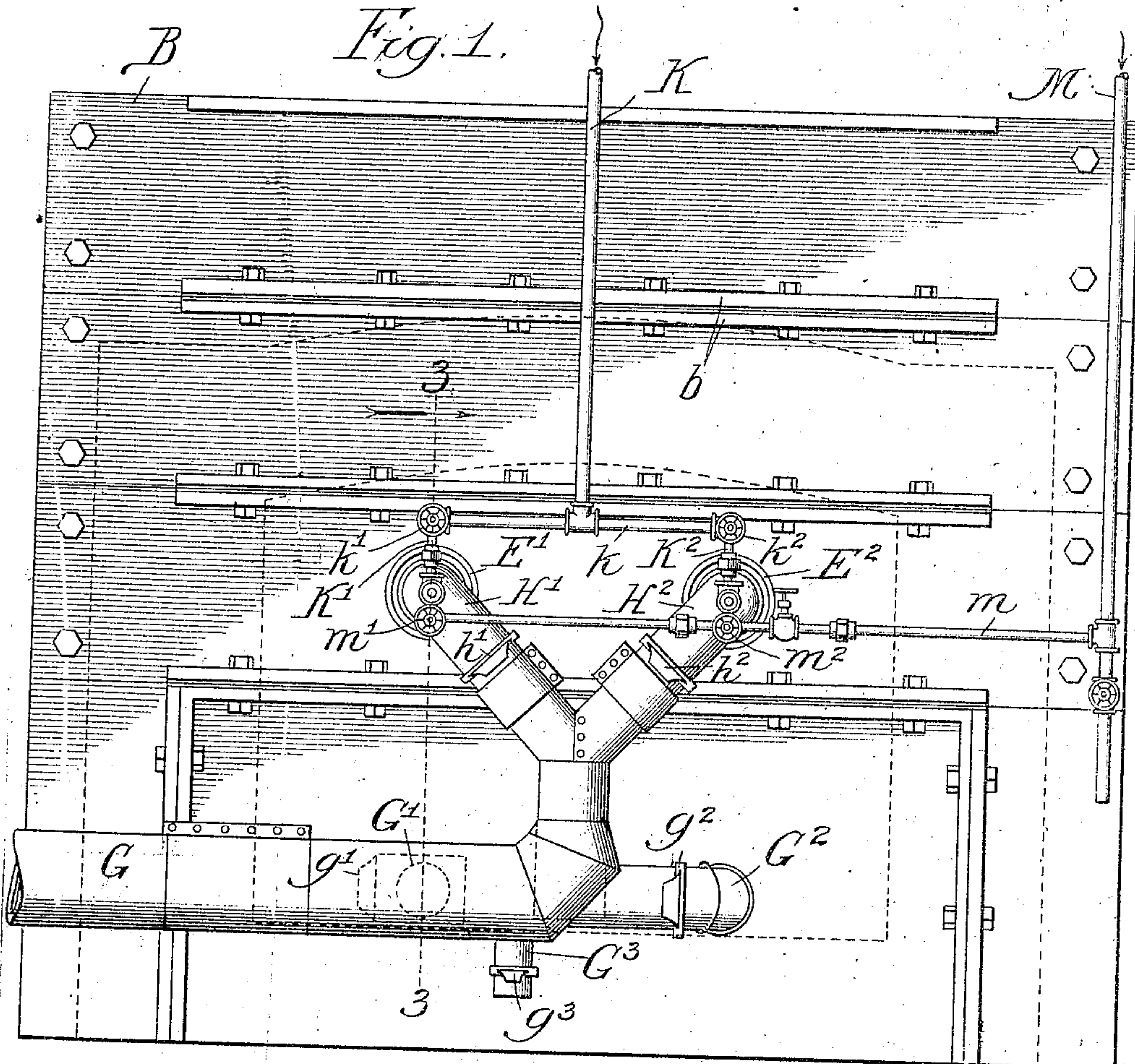
PATENTED APR. 28, 1908.

G. FRASER.

OIL BURNING REVERBERATORY FURNACE.

APPLICATION FILED APR. 22, 1907.

2 SHEETS—SHEET 1.



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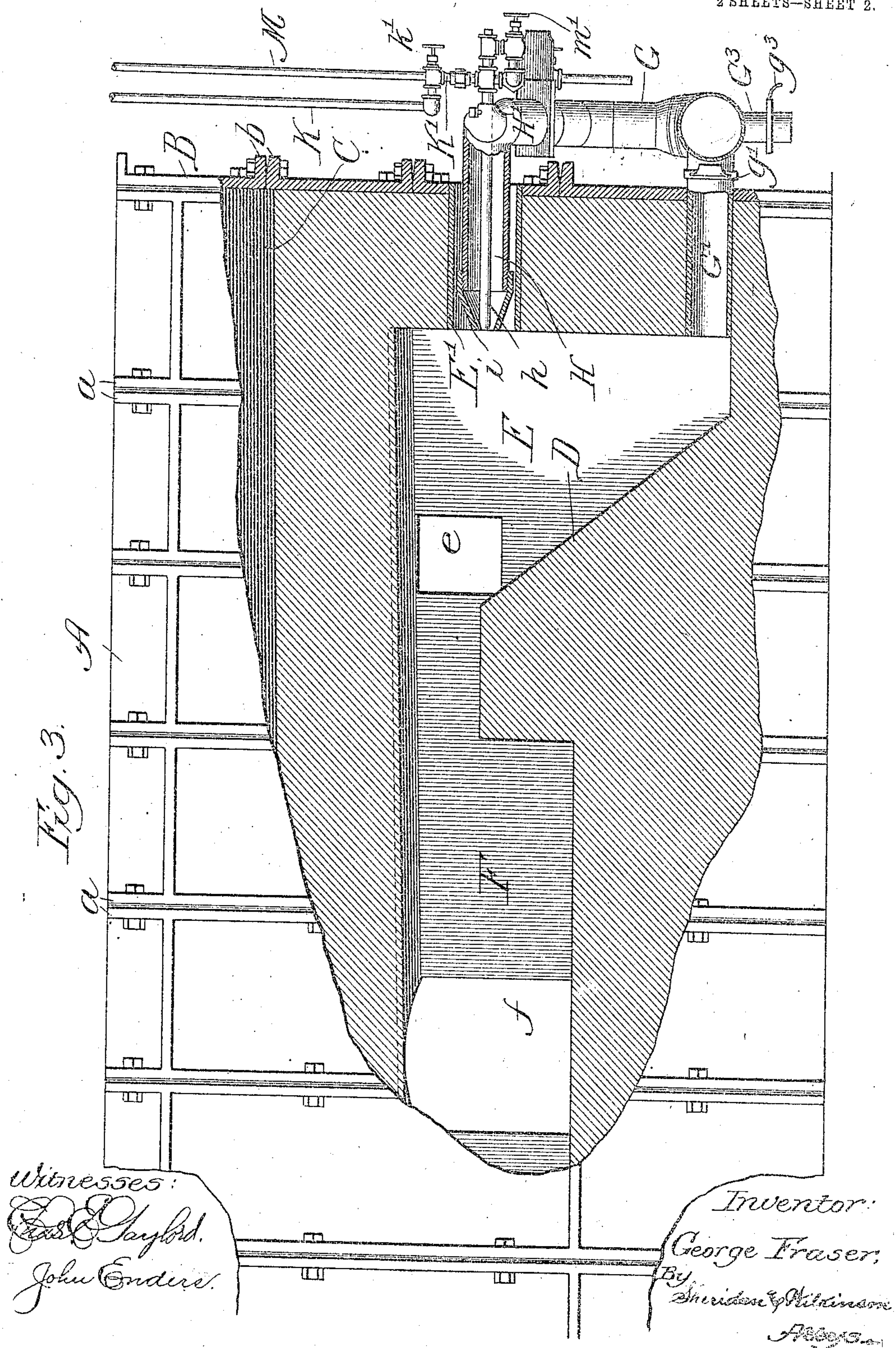
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UNITED STATES PATENT OFFICE.

GEORGE FRASER, OF TOPEKA, KANSAS.

OIL-BURNING REVERBERATORY FURNACE.

No. 886,050.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed April 22, 1907. Serial No. 369,617.

To all whom it may concern:

Be it known that I, GEORGE FRASER, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Oil-Burning Reverberatory Furnaces, of which the following is a specification.

My invention relates in general to furnaces, and more particularly to oil burning reverberatory furnaces.

The primary object of my invention is to provide a reverberatory furnace in which crude oil or residuum may be successfully burned by thoroughly mixing the sprayed liquid fuel with an air blast in suitable quantities, reflecting and concentrating the generated heat to produce perfect combustion, and discharging the gases in a state of perfect combustion into a working chamber, thereby resulting in a high, uniform, and evenly distributed heat, free from violent drafts, throughout the entire working chamber.

A further object of my invention is to provide an oil burning reverberatory furnace, which will be simple in construction, inexpensive in manufacture, and efficient in use.

The embodiment of my invention herein disclosed may be generally described as comprising an initial chamber, through openings in the wall of which a plurality of burners concentrically extend, each burner comprising inner and outer concentric tubes, an air supply conduit communicating with the outer burner tubes, an oil supply conduit communicating with the inner burner tubes, a bridge wall intermediate of the initial chamber and a working chamber, the top edge of the bridge wall being in the same horizontal plane as the centers of the burners, openings leading into the initial chamber adjacent the bottom thereof through which air is supplied, valves for regulating the supply of oil to the burners, gates controlling the supply of air both to the burners and to the lower openings, steam supply conduits communicating with the inner tubes of the burners, and valves controlling the supply of steam to the burners.

My invention will be more fully described hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is a front elevational view; Fig. 2, a central sectional view, showing one of the burners on an enlarged scale; and Fig. 3, a vertical sectional view on line 3, 3, Fig. 1, the surrounding wall being partially shown in elevation.

The same reference characters are used to designate the same parts in the several figures of the drawings.

Reference letter A indicates the housing of a furnace, which is preferably made in sections united by bolts extending through flanges *a, a* on the adjacent sections.

B designates the front of the housing, which is also preferably made in sections united by bolts extending through flanges *b, b* on the adjacent sections, the front wall of the housing being also united by bolts to the side walls A.

C indicates the fire-brick lining of the furnace, within which is formed an initial chamber E and a working chamber F, a bridge wall D being provided intermediate of the said chambers. The initial chamber E is provided with an opening *e* leading thereto through which access may be had for the purpose of inspection.

f indicates one of the door openings leading to the working chamber for the introduction and removal of the material after being heated.

Extending horizontally through the front wall of the fire-brick lining are openings, such as indicated at *E'* and *E''*, through which burners extend to the interior of the initial chamber E. Each of the burners comprises an outer tube H extending through the corresponding opening, but spaced apart therefrom to form an annular passageway, and an inner tube *h* located concentrically within the outer tube. A nozzle or conical cap *z* is secured around the inner end of the outer tube H of each burner, so as to form a restricted annular passageway leading to the interior of the initial chamber around the central tube and air supply conduit through which air is forced at a suitable pressure, as, for instance, about eight ounces. An air conduit G is provided with branches *G'* and *G''* extending through openings in the furnace front to the interior of the initial chamber adjacent the bottom thereof. Gates *g'* and *g''* are provided for controlling the passage of air through such branched conduits. The air supply conduit G is also provided with upwardly diverging

branches H' , H^2 , which communicate with the outer tubes H of the burners. Gates h' , h^2 are located in the branch conduits H' , H^2 for controlling the passage of air there-
5 through.

K designates a conduit through which oil is supplied, preferably, at about thirty-five pounds pressure to force the oil to the burners. At the lower end of the oil supply conduit K is provided a transverse conduit k , the
10 opposite ends of which are connected by suitable couplings K' and K^2 with the inner tubes h of the burners. The valves k' and k^2 are provided for controlling the supply of oil to
15 the inner tubes of the burners.

M designates a conduit through which steam is supplied from any suitable source.

m indicates a horizontally extending conduit communicating with the steam conduit
20 M and also communicating, by suitable couplings, with the inner tubes h of the burners, valves m' , m^2 being provided for controlling the supply of steam to the burners.

The conduit M is shown as continued down-
25 wardly below the horizontal conduit m , and is provided with a valve so as to permit water of condensation to be drained from the steam supply conduit.

The operation of my improved furnace is
30 as follows: The valves controlling the steam conduits are closed and the valves controlling the supply of oil opened to an extent sufficient to supply the desired quantity of oil. The gates controlling the air supply are also
35 opened to an extent to permit the desired proportion of air to be delivered to the initial chamber. The oil is sprayed at the burners and is mixed with the air discharged through the annular passage-way between the inner
40 and outer tubes of the burners. The air is delivered to the initial chamber through the branch conduits G' and G^2 , strikes the intensely heated inclined face of the bridge wall D and is thereby heated and thoroughly
45 diffused, so as to be mixed with the oil sprayed from the burners, thereby producing perfect combustion. The gases in such state of perfect combustion are discharged over the
50 upper edge of the bridge wall into the working chamber, thereby producing a high, uniform and evenly distributed heat throughout the working chamber, such heat being free from excessive blast, owing to the upper edge
55 of the bridge wall extending to the horizontal plane of the centers of the burners. The passage of the air through the annular opening in the burners not only sprays the oil, but also keeps the burners cool, as well as the
60 nozzles on the ends thereof. The air induced through the annular openings around the burners also serves to keep the burners cool.

When the supply of oil and air to the burners is discontinued, the valves are opened in
65 the steam conduit, so that steam will be discharged through the inner tubes of the burn-

ers, thereby preventing the hot interior fire-brick walls of the furnace from burning the ends of the burners.

From the foregoing description, it will be observed that I have invented an improved
70 reverberatory furnace by means of which crude oil or residuum may be efficiently burned, and by means of which thorough combustion is secured and uniform heat produced throughout the working chamber.
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Having now fully described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. In an oil burning reverberatory furnace, the combination with an initial chamber, of
80 a working chamber, said chambers having a continuous dome, a rearwardly inclined bridge wall intermediate of said chambers, a burner located in the same horizontal plane as the top of the bridge wall and extending
85 in concentric alinement with an opening in the furnace front, said opening being adjacent the under surface of the dome of the initial chamber, an air supply conduit communicating with said burner, an oil supply
90 conduit communicating with said burner, and means for regulating the supply of oil and air to said burner.

2. In an oil burning reverberatory furnace, the combination with an initial cham-
95 ber, of a working chamber having a dome forming a continuation of the dome of the initial chamber, a rearwardly inclined bridge wall intermediate of said chambers, a burner
100 located in substantially the same horizontal plane as the top of said bridge wall and extending in concentric alinement with an opening in the furnace front, said opening
105 lying adjacent the under surface of the dome of the initial chamber, means for regulating the supply of oil and air to said burner, an air supply conduit leading to said initial chamber below said burner, and means for controlling the supply of air through said opening.
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3. In an oil burning reverberatory furnace, the combination with an initial chamber, of a working chamber having a dome forming a continuation of the dome of the
115 initial chamber, a rearwardly inclined bridge wall intermediate of said chambers, a plurality of burners located in the same horizontal plane as the top of said bridge wall and extending in concentric alinement with
120 openings in the furnace front, said openings lying adjacent the dome of the initial chamber, an air supply conduit having branches communicating with said burners, an oil supply
125 conduit having branches communicating with said burners, and means for regulating the supply of air and oil to said burners.

4. In an oil burning reverberatory furnace, the combination with an initial chamber, of a working chamber having a dome forming a continuation of the dome of the
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initial chamber, a rearwardly inclined bridge wall intermediate of said chambers, a plurality of burners located in the same horizontal plane as the top of said bridge wall and concentrically alining with openings in the furnace front, said burners comprising concentric outer and inner tubes, an air supply conduit having branches communicating with the outer tubes of said burners, an oil supply conduit having branches communicating with the inner tubes of said burners, means for regulating the supply of oil and air to said burners, a steam supply conduit having branches communicating with the inner tubes of said burners, and means for controlling the flow of steam to said burners. 15

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Witnesses:

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