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J. H. BECKER.
LIQUID HYDROCARBON FURNACE.
APPLICATION FILED SEPT. 28, 1910.

Patented Apr. 18, 1911.

2 SHEETS—SHEET 1.

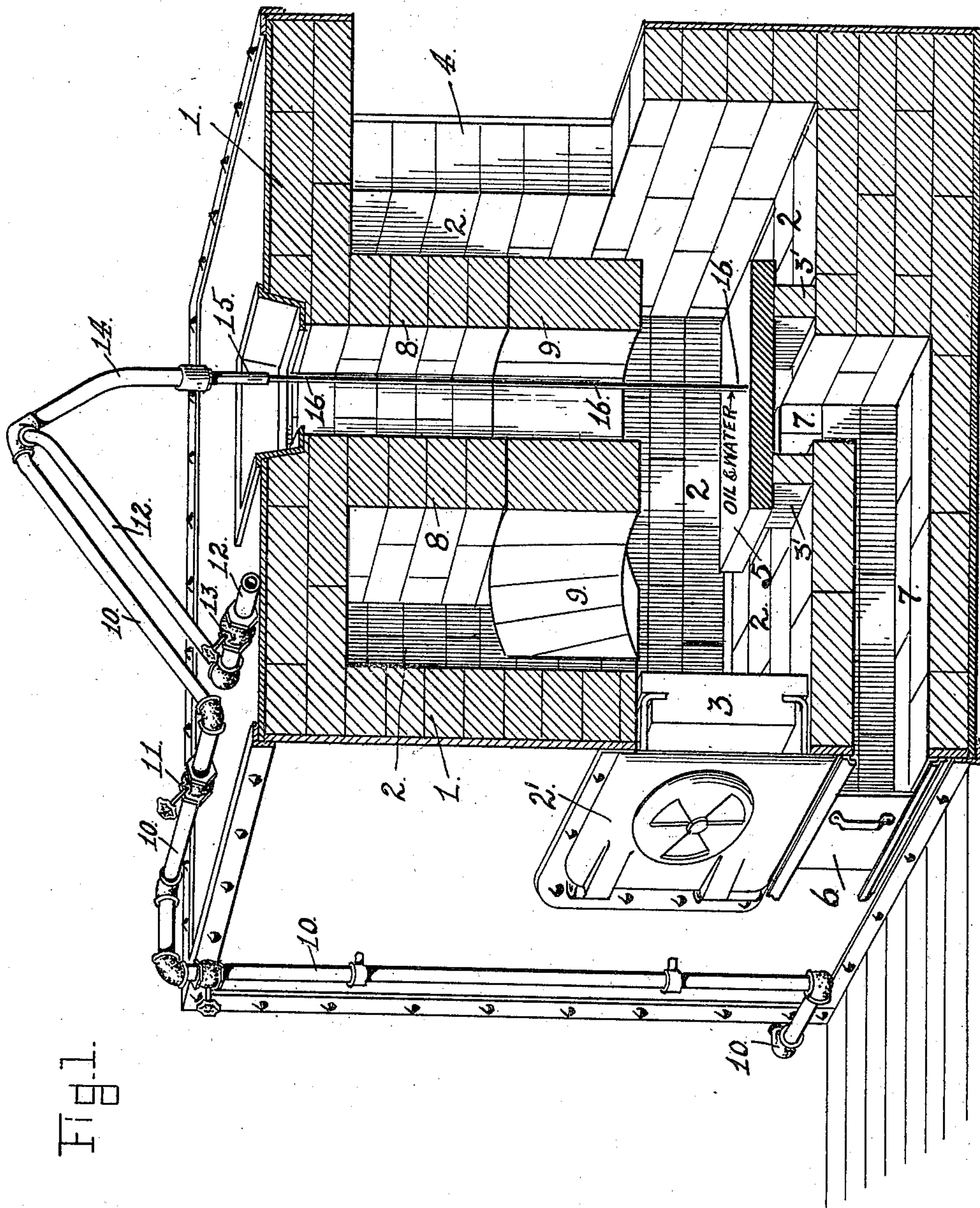


Fig. 1.

Witnesses.
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2 SHEETS-SHEET 2.

Fig. 2.

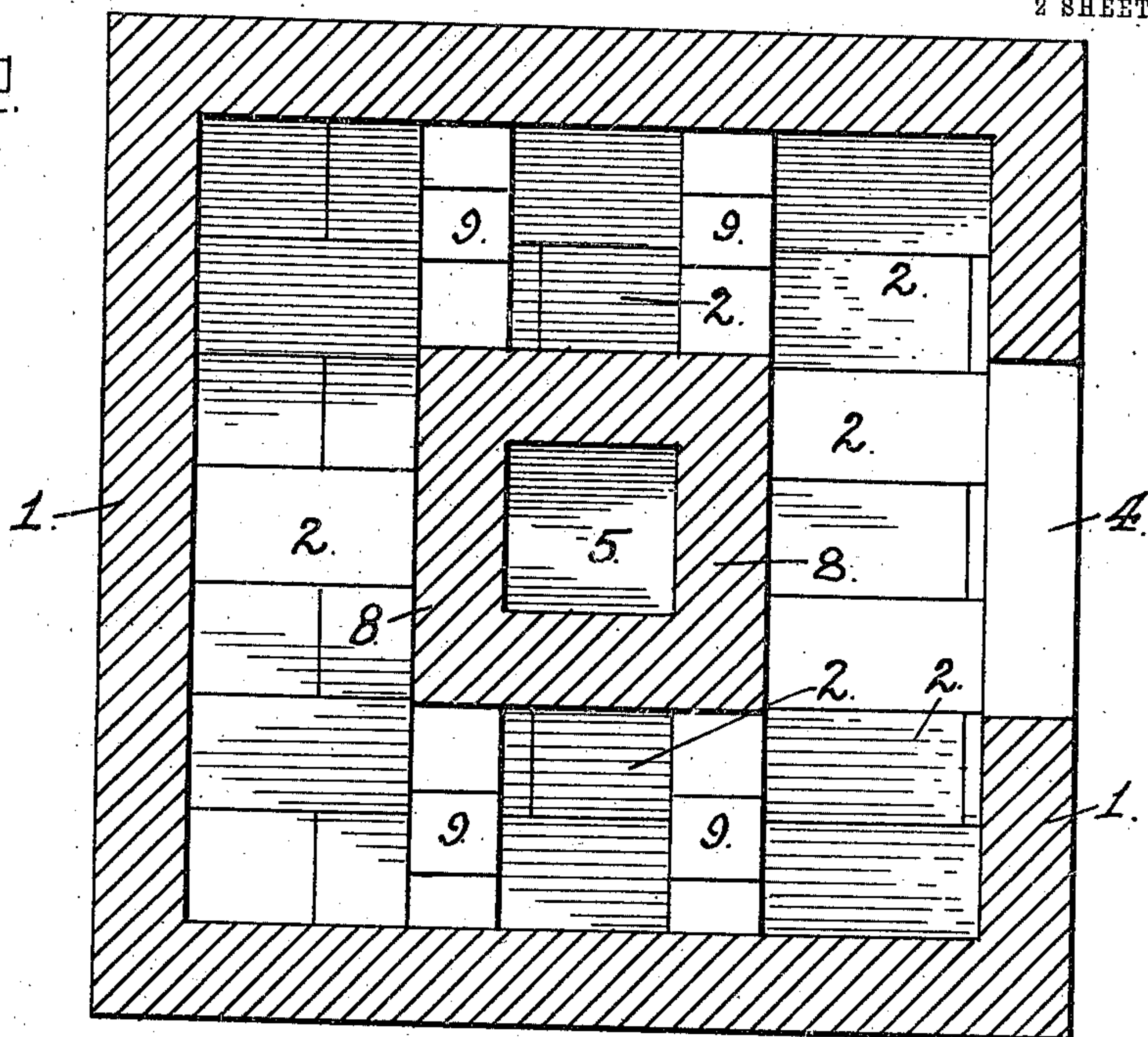
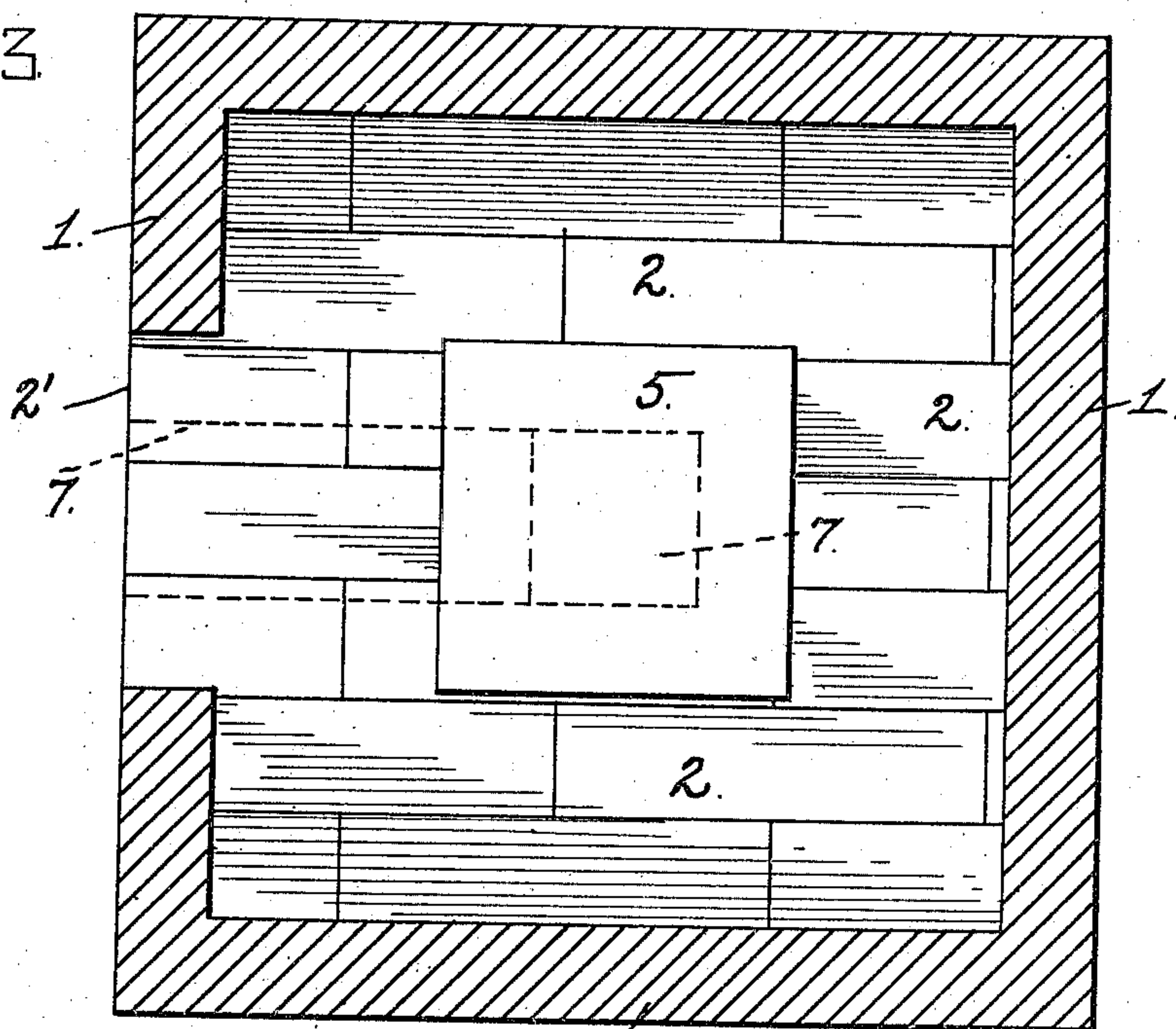


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

JULIUS H. BECKER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO J. H. KING, OF OAKLAND, CALIFORNIA.

LIQUID-HYDROCARBON FURNACE.

989,828. Specification of Letters Patent. **Patented Apr. 18, 1911.**

Application filed September 28, 1910. Serial No. 584,192.

To all whom it may concern:

Be it known that I, JULIUS H. BECKER, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Liquid-Hydrocarbon Furnaces, of which the following is a specification.

My invention relates to the class of burners or furnaces adapted for the combustion of liquid-hydrocarbons, and especially for crude petroleum.

My invention has for its object the provision of a burner or furnace in which crude-petroleum, particularly when delivered with water, can be effectually and economically used as fuel; and to this end my invention consists in the novel construction of the combustion chamber and the means for supplying the fuel thereto, as I shall hereinafter fully describe, by reference to the accompanying drawings in which—

Figure 1 is a broken perspective view of my liquid hydrocarbon furnace. Fig. 2 is a horizontal cross section of the same, taken through the flame exit of the shell. Fig. 3 is a similar section taken lower down through the door-opening and just above the atomizing or firing plate.

The shell 1 is composed of suitable refractory material, such as fire brick with an outer covering of metal. In the shell is formed the combustion chamber 2, which has on one side a door 2', protected by a refractory shield 3, and on the opposite side it is provided with the flame exit 4, which leads to any suitable destination, as, for example, to a flue under a boiler.

Supported within the lower portion of the combustion chamber upon fire bricks 3' is the atomizing or firing plate 5 of such dimensions as to leave the combustion chamber capacious on all sides. This plate 5 is best made of steel, as this metal will longer stand the heat without cracking. The size of this plate is such that it can be removed through the door 2'.

Leading from the exterior and controlled by a door 6 is a passage 7 in the base of the shell, which passage opens interiorly under the plate 5, and said plate forms a roof or covering for the passage.

Extending downwardly from the top of the shell and depending in the combustion

chamber is a flue 8, the upper end of which is open to the exterior, and its lower end, which is also open, terminates a sufficient distance directly above and in line with the plate 5, to afford room for readily removing said plate. This removal of the plate is necessary for the substitution of another, as the first burns out, and provision is thus made by the construction shown for the ready interchange of plates. As the flue 8 must therefore terminate above and clear of the plate, it must have some sufficient support, and this is found in the separated arches 9 which spring from the sides of the shell, but leave the combustion chamber comparatively clear to surround said flue. The combustion chamber has thus for its outer boundary the shell walls, and for its inner boundary the flue 8, which in its best form is made of fire brick.

10 is a water supply pipe controlled by a valve 11.

12 is an oil supply pipe controlled by a valve 13. These pipes 10 and 12 meet in a delivery pipe 14, the discharge tip 15 of which lies just within the open top of the flue 8.

In operation, an initial fire is made from any suitable fuel in the passage 7, and is continued until the plate 5 is sufficiently heated to vaporize the water which the oil is dropped upon it. Thereupon the door 6 is closed and water and crude petroleum, joining in the pipe 14, are delivered through the tip 15 into the flue 8 and drop upon the plate 5, as is indicated by the stream 16 in Fig. 1. The fall is sufficient to cause the mixed oil and water to spatter and atomize upon the plate, and the mixture spreading out over the plate, vaporizes and takes fire, and burns with a flame which spreads to all sides of the combustion chamber, and passes around the flue 8 and thence to the exit 4. The draft necessary for combustion comes down the flue 8 with the falling fuel mixture.

Gravity alone is here involved in the feed and in the atomizing, and the construction of the combustion chamber is such that because of the walls of the shell and the walls of the interior flue 8, the maximum area of heat accumulating and retaining surface is available.

Having thus described my invention what

I claim as new and desire to secure by Letters Patent is—

1. A liquid-hydrocarbon furnace comprising a shell inclosing a combustion chamber, said shell having in one of its sides a door-controlled opening and in its opposite side a flame exit; a removable firing plate in the lower portion of the chamber, of dimensions adapting it to be inserted and removed through the door-opening; a flue depending from the top of the shell into the combustion chamber and spaced from the walls thereof, said flue opening out above through the top of the shell and opening out below over and spaced from the firing plate; spaced arches springing from the shell walls and supporting the lower end of the flue; and means for delivering the liquid fuel into said flue so that it will fall and spatter upon said plate.

2. A liquid-hydrocarbon furnace comprising a shell inclosing a combustion chamber, said shell having in one of its sides a door-controlled opening and in its opposite side a flame exit, and having formed in its bottom a passage leading from the exterior and opening up through the floor of the combustion chamber; a removable firing plate in the lower portion of the chamber directly over the inner end of said passage and of dimensions adapting it to be inserted and removed through the door opening; a flue

depending from the top of the shell into the combustion chamber and spaced from the walls thereof, said flue opening out above through the top of the shell and opening out below over and spaced from the firing plate; spaced arches springing from the shell walls and supporting the lower end of the flue; and means for delivering the liquid fuel into said flue so that it will fall and spatter upon said plate.

3. A liquid-hydrocarbon furnace comprising a shell inclosing a combustion chamber and having in one of its sides a flame exit; a firing plate in the lower portion of the combustion chamber; a flue depending from the top of the shell into the combustion chamber and spaced from the walls thereof, said flue opening out above through the top of the shell and opening out below over and spaced from the firing plate; spaced arches springing from the shell walls and supporting the lower end of the flue; and means for delivering the liquid fuel into said flue so that it will fall and spatter upon said plate.

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

JULIUS H. BECKER.

Witnesses:

WM. F. BOOTH,
D. B. RICHARDS.