B. HERSHEY.

HYDROCARBON FURNACE.

No. 189,217. Patented April 3, 1877.

Fig. 1.

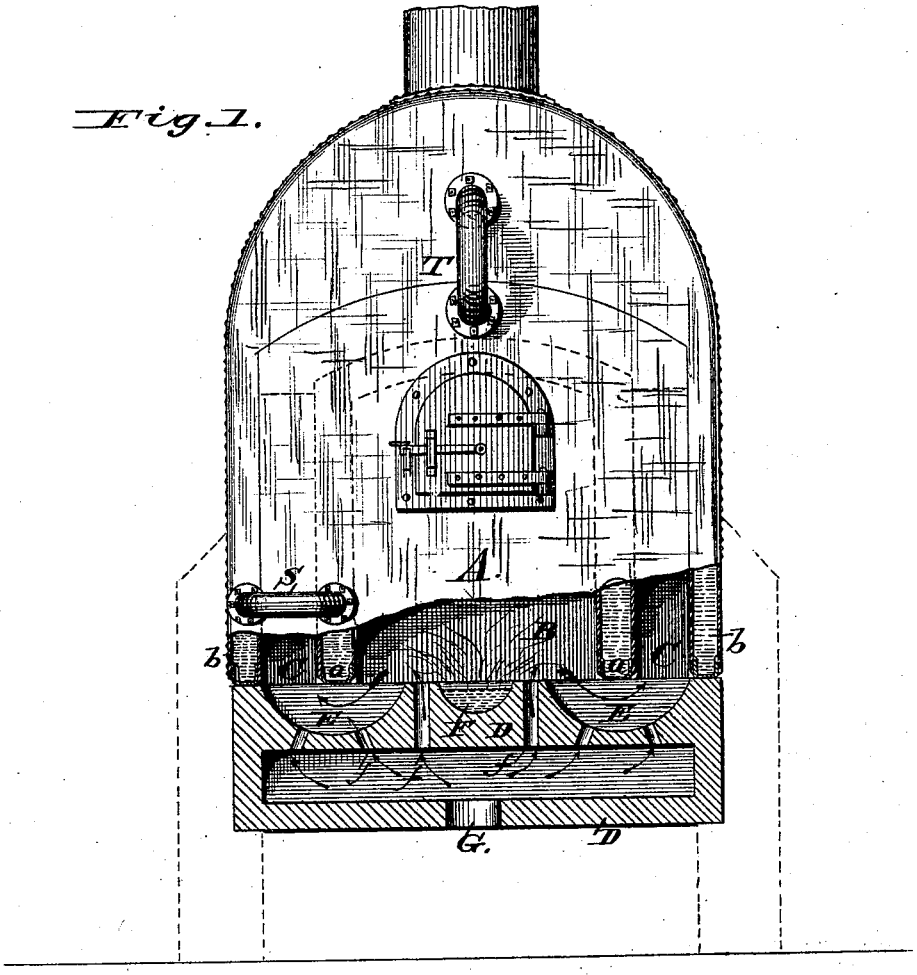
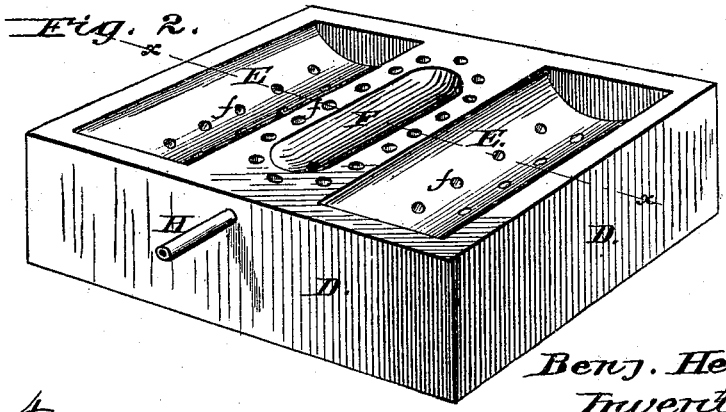


Fig. 2.



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UNITED STATES PATENT OFFICE.

BENJAMIN HERSHEY, OF ERIE, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN E. SHAW, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN HYDROCARBON-FURNACES.

Specification forming part of Letters Patent No. **189,217**, dated April 3, 1877; application filed February 20, 1877.

To all whom it may concern:

Be it known that I, BENJAMIN HERSHEY, of Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Boiler Furnaces, of which the following is a specification:

This invention relates to certain improvements in furnaces for various purposes, but is particularly designed for steam-boiler furnaces; its object being to provide for the combustion in such furnaces of liquid or gaseous fuel, such as the various liquid hydrocarbons and inflammable gases.

Attempts have heretofore been made to employ such fuel as a heating agent for furnaces; but most of such attempts have proved futile or impracticable, owing to the difficulty of conveniently supplying the liquid or gas to the furnace, and regulating and controlling the draft so as to supply the air conveniently and in suitable quantities to properly support combustion.

The object of my present invention, therefore, is to obviate these difficulties, and provide a furnace by means of which either liquid or gaseous fuel may be conveniently supplied to and retained in the furnace while undergoing combustion, and in which the combustion may be easily and perfectly regulated, and the draft admitted to the fuel, and its action in supporting combustion controlled.

To this end my invention consists in a peculiar grate and receptacle for the fuel, when such is employed in a liquid state, consisting of a hollow chamber, of fire-brick or other refractory material. The upper side of said hollow chamber is divided into three troughs or compartments, the central trough or compartment being designed for the reception of the liquid fuel, the others being perforated and communicating with the air-space below, which is connected with a suitable blast apparatus. The central receptacle is also provided with similar apertures around its edge, and the whole is adapted to be placed in the lower part of the fire-chamber of the furnace, and operated as more fully hereinafter set forth.

In the drawings, Figure 1 represents a view, partly in elevation, of a boiler-furnace, showing my improvement in section; and Fig. 2 is a perspective view of my improved grate detached.

The letter A represents a furnace, which may be of any approved construction, but is preferably constructed as represented, with inner and outer water-legs *a b*, forming an inner combustion-chamber, B, with flues C C at each side, said water-legs being connected together by pipes S, and to the boiler by pipes T.

The letter D represents a trough or chamber, of fire-clay or other refractory material, the upper face or top of which is divided into three compartments, E, E, and F, the central one, F, of which is somewhat smaller than the others, and forms the receptacle for the liquid fuel. The compartments E E, at each side, are perforated in parallel rows at the bottom, communicating with the space below, which is connected, by means of a suitable pipe passing into aperture G, with a blast apparatus of any description. The walls around the central compartment are also provided with perforations *f*, leading to said space. The said compartments are preferably formed of a semi-cylindrical shape, the central one being rounded at its ends, so as to form an oblong dish-shaped receptacle, into which the oil is admitted through a tube, H.

The trough or chamber as thus constructed is located directly under the fire-chamber of the boiler, the centers of the outer compartments E falling directly under the walls *a* of the inner combustion-chamber, the inner compartment F falling directly under the center of the inner combustion-chamber.

The operation of my invention is as follows: The central compartment being filled with liquid hydrocarbon, or a stream of inflammable gas being admitted thereto through the pipe H, and, upon being ignited, the flame extends up into the fire-chamber, combustion being supported therein by the blast of air through the apertures *f*, and the heated products of combustion, with the unburned inflammable gases, are deflected at each side under the inner water-legs, where they meet

a current of fresh air from the chambers or compartments E, insuring thorough combustion in the side flues, and a perfect and economical consumption of fuel.

What I claim, and desire to secure by Letters Patent, is—

1. The hollow chamber, of fire-brick or other refractory material, divided into three troughs or compartments, the central one forming the fuel-chamber, and the others being perforated and communicating with the air-chamber, which is connected with a blast apparatus, the whole forming a grate for burning liquid fuel, substantially as set forth.

2. In combination with the fire-chamber of a furnace, the central hydrocarbon-receptacle, with surrounding air-passages, the troughs or compartments at each side, provided with air-passages, and the water-legs *a* and *b*, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of the subscribing witnesses.

BENJAMIN HERSHEY.

Witnesses:

GEO. P. GRIFFITH,

D. E. BURTON.