S. A. HILL.

HYDROCARBON BURNER.

No. 85,663. Patented Jan. 5, 1869.

Fig. 2.

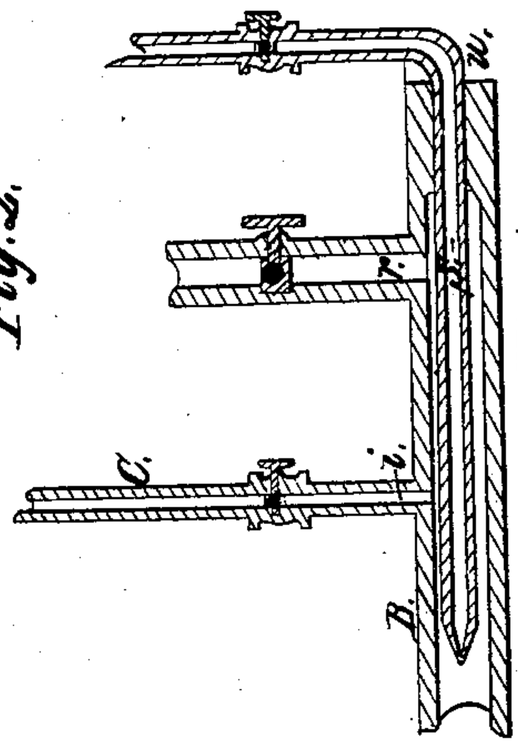
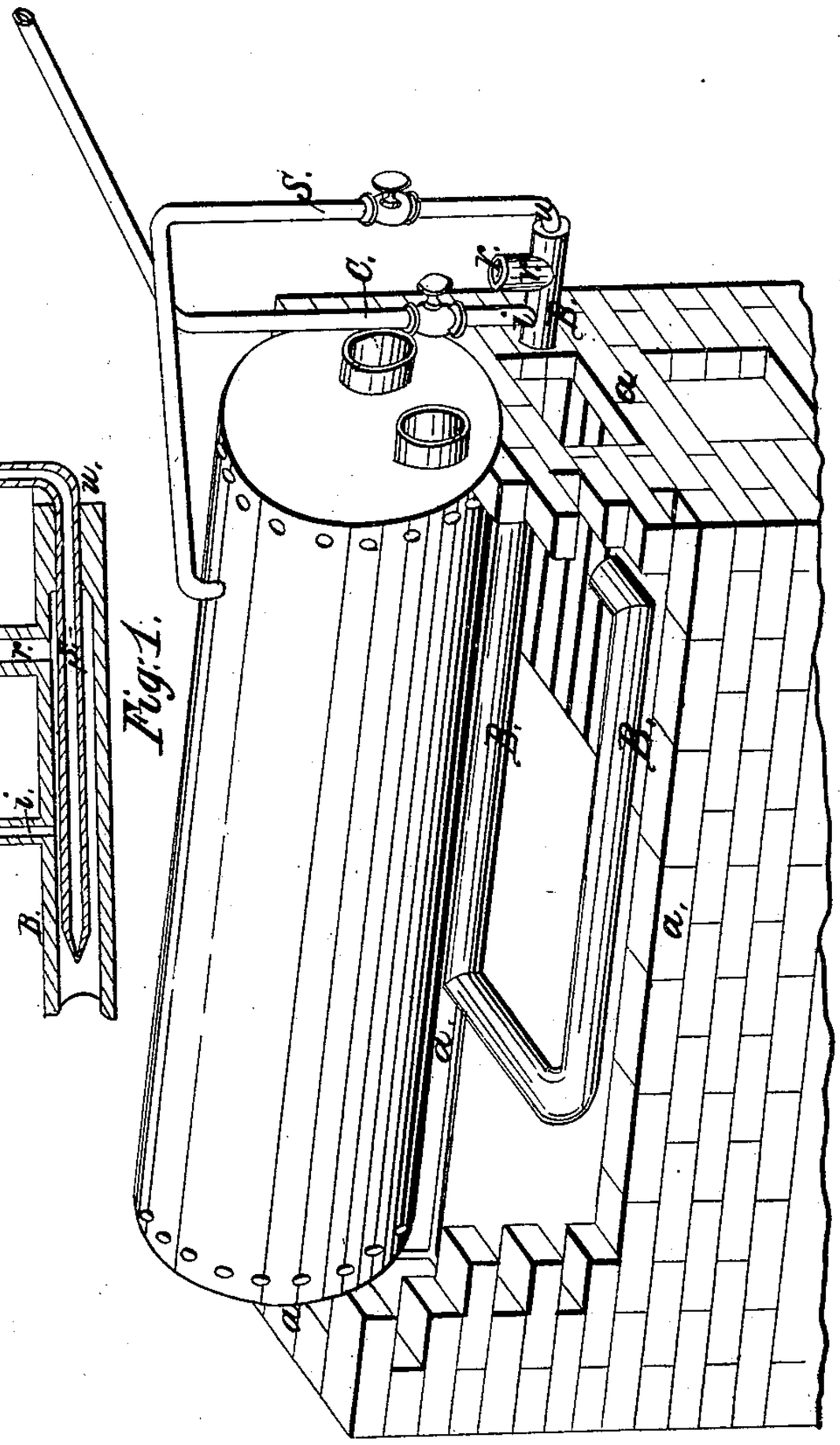


Fig. 1.



Witnesses.

Chas A. Pettit

Geo. H. Morrison

Inventor.

Samuel A. Hill

per Munn & Co.

attys.

United States Patent Office.

SAMUEL A. HILL, OF OIL CITY, ASSIGNOR TO HIMSELF, AND CHARLES F. THUMM, OF SAME PLACE, AND OLIVER P. SCAIFE, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 85,663, *dated January* 5, 1869.

IMPROVEMENT IN HYDROCARBON-BURNERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, SAMUEL A. HILL, of Oil City, in the county of Venango, and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Burning Hydrocarbon-Fluids; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in providing an apparatus, constructed and operating substantially as hereinafter described, for transforming hydrocarbon-fluids into a fumous body by a current of atmospheric air, caused by the inductive force of a stream of steam through a pipe, said steam being used as a vehicle for carrying said fumous body to and expanding it in a furnace, there to be ignited and used as an element for generating an intense heat.

To enable others skilled in the art to which this improvement belongs, to make and use my invention, I will proceed to describe its construction and operation.

In the accompanying drawings, which form a part of my specification—

Figure 1 is a perspective view of my improvement when connected with an ordinary steam-boiler furnace.

Figure 2 is a vertical longitudinal section through the portion of the apparatus at the junction of the pipes.

In the drawings—

a a a represent the walls of a steam-boiler furnace, which furnace is provided with the usual appendages.

B is a pipe, two inches or more in diameter, which extends from the outside of the front end of the furnace, past the side of the grate-bars, to and across the rear end of the furnace, and thence along the other side of the grate-bars, terminating at the side opposite to that where the pipe enters the furnace.

The other end of this pipe projects about twelve inches out of the front end of the furnace, and has two openings, *i* and *r*, on the upper side of it, and one opening, *u*, at the end.

C is a small pipe, having its lower end inserted in the opening *i*, and its upper end connected to a suitable vessel for containing the hydrocarbon-fluid to be burned. This pipe C is provided with a valve for regulating the flow of the hydrocarbon-fluid into the pipe B.

The pipe marked S is about a half inch in calibre, and is reduced, at one end, to about an eighth of an inch. This pipe S is inserted in the pipe B at *u*, and the other end of it is connected to the steam-boiler, and is provided with a valve for regulating the flow of steam through it.

The opening *r*, in the upper side of the pipe B, is as large as the diameter of the pipe will admit of, and is provided with a valve or stop-cock, with which to regulate the admission of the air.

The size, form, and arrangement of the several parts of my improved apparatus I leave to the skill and good judgment of the mechanic.

As the construction of my improved apparatus, and the relation that the several parts sustain to each other, will be readily understood from the above description, and by reference to the accompanying drawings, therefore, without further description of its construction, I will proceed to describe its operation, which is as follows:

The hydrocarbon-fluid is put in the vessel provided for it. I then make a fire in the boiler-furnace, in the usual manner, with the ordinary fuel, and raise steam to the desired pressure. I then open the valve of the pipe S, which will cause a current of steam to flow through pipe B. I then open the valve to the opening *r*. I then open the valve of the pipe C, so as to allow the desired flow of oil into the pipe B. Now, the stream of steam from pipe S will cause or create a partial vacuum in pipe B, forward of the opening *r*, and the air will rush in to fill up this partial vacuum, and thereby cause a very strong current of air in pipe B, which current of air will, in every case, be in proportion to the size of the opening *r* and the pressure of the steam in the boiler. The hydrocarbon-fluid, as it drops or flows from pipe C through the opening *i*, is taken up by the current of air, and so separated as to form a fumous body, which is carried, by the steam, into the furnace, where it is expanded, ignited, and consumed.

When I use a heavy or thick hydrocarbon-fluid, I use a fire in the furnace, in connection with the heat generated by the burning of the fumous body, formed by the current of air caused by the inductive force of the stream of steam. This additional fire is used for heating the pipe B, thereby facilitating the transformation of the heavy or thick fluid, by the current of air, into a fumous body, as aforesaid.

I am aware that a current of air has been forced over and through hydrocarbon-fluids; and I am also aware that steam has been used in combination with hydrocarbon-fluids, and that hydrocarbon-fluids, combined with steam and air, have been used; therefore, I wish it clearly understood that I do not claim broadly the use of steam and air, when used in combination with hydrocarbon-fluids, for the purpose of burning the same; but

What I do claim, as of my invention, is—

Transforming hydrocarbon-fluids into a fumous body by the contact of a current of atmospheric air, caused by the inductive force of a stream of steam, so applied as to come in contact with the air and hydrocarbon-vapor, after the latter have been commingled, substantially as herein described, and for the purpose set forth.

Also, in combination with the above, the use of steam as a vehicle for carrying said fumous body to the furnace, substantially as described, and for the purpose set forth.

Also, the pipe B, provided with openings *i* and *r*, when used in combination with the pipe S, constructed, arranged, and operating substantially as herein described, and for the purpose set forth.

SAMUEL A. HILL.

Witnesses:

W. B. SCAIFE,

EDWARD H. KNIGHT.