J. W. NEELEY.

Hydro-Carbon Burner.

No. 164,655. Patented June 22, 1875.

Fig. 1.

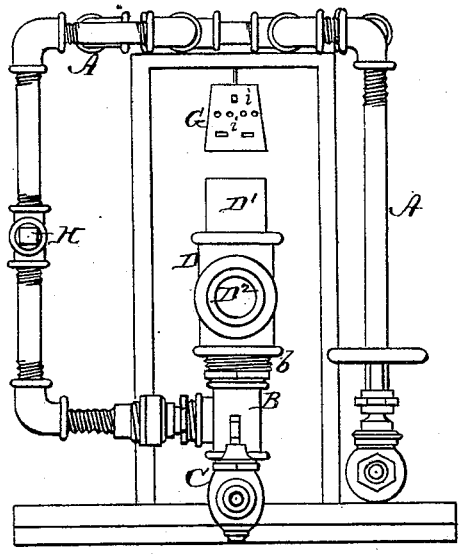


Fig. 2.

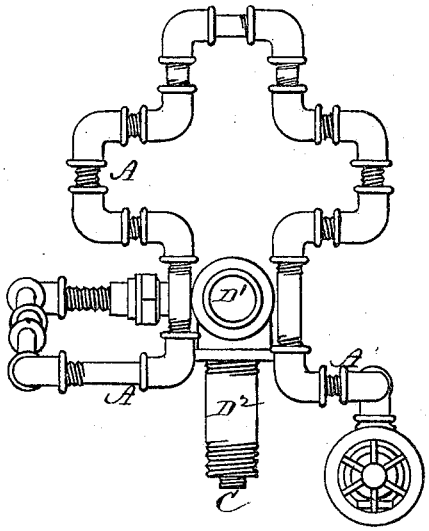
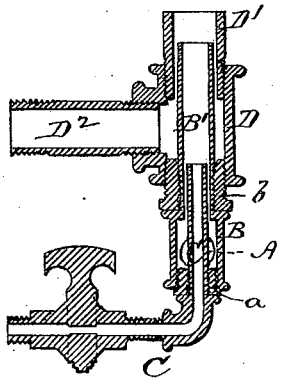


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN W. NEELEY, OF PETROLIA, PENNSYLVANIA.

IMPROVEMENT IN HYDROCARBON-BURNERS.

Specification forming part of Letters Patent No. **164,655**, dated June 22, 1875; application filed July 28, 1874.

To all whom it may concern:

Be it known that I, JOHN W. NEELEY, of Petrolia, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Burning Petroleum or other Hydrocarbon Liquids for Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

The nature of my invention consists in the construction and arrangement of an apparatus for converting petroleum or other hydrocarbon liquids into gas by means of superheated steam and air, to burn as fuel under boilers for the generation of steam, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, which forms a part of this specification, and in which—

Figure 1 is a front elevation, and Fig. 2 a plan view, of my apparatus. Fig. 3 is a longitudinal vertical section of the gas-generating device in the apparatus.

A represents a steam-pipe leading from the boiler upward into the fire-box, and immediately under the crown-sheet of the same it forms a winding, serpentine, or tortuous pipe, as shown in Fig. 2, for the purpose of superheating the steam passing through it. The pipe A then passes downward within the fire-box, and into a T-joint, B, from the upper end of which extends a pipe, B′. In the lower end of the T-joint B is screwed a bushing, *a*, through which passes a pipe, C, leading from the tank containing the petroleum, oil, or other hydrocarbon liquid, said pipe C extending a suitable distance above the entrance of the steam-pipe A into the pipe B′, as shown in Fig. 3. On the lower end of the pipe B′, immediately above the T-joint B, is screwed a bushing, *b*, which is screwed into a T-joint, D, at the lower end thereof, and in the upper end of said T-joint is screwed a short pipe, D^1, the pipe B′ entering said short pipe D^1. From the side of the T-joint D leads a pipe, D^2, to the outside of the fire-box for supplying air. Above the pipe D^1, from the top of the fire-box, is suspended a bell-shaped generator, G, made of cast-iron or other suitable material, and provided with apertures *i i* for the escape of the gas. The device, as shown in Fig. 3, is located in the ash-pit below the grate-bars, the pipe D^1 extending even or nearly even with the top surface of the grate-bars.

The operation is as follows: A wood or coal fire is first built on the grate to get any desired pressure of steam, when, by turning a steam-cock, the steam is allowed to pass through the pipe A, and during its passage through the same it becomes superheated. In this state it passes into the T-joint B, enveloping the oil-pipe C, and passing up around the same. This creates a vacuum in said pipe, whereby the oil is drawn up, and becomes vaporized, and passes up with the steam through the pipes B′ and D^1. This again creates another vacuum, causing the air to be drawn in through the pipe D^2 and mixed with the vaporized oil and steam. The steam, being superheated, is resolved or decomposed into its constituent parts, and supplies an additional amount of oxygen to the oil-vapor, which is necessary to make an intense heat. In this state it passes up into the red-hot generator G, where it is converted into gas, and, passing out through the openings *i*, is ignited and burns, supplying the required heat to the boiler.

With this device oil may be used as fuel with great economy and safety, requiring no change in the construction of the boilers or fire-boxes to the boilers; and it may be applied to stationary boilers as well as to locomotives, fire-engines, steamships, or almost any place where heat is required.

The oil-tank may be either above or below the apparatus, as may be most convenient. In the steam-pipe A, just before it turns into the apparatus, is a connection, H, with or without stop-cock, for the purpose of taking the superheated steam to be used for any other purpose where it may be needed.

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

The bell-shaped generator and burner G, provided with apertures *i*, in combination with the oil, steam, and air pipes, as described, and for the purposes set forth.

In witness that I claim the foregoing I have hereunto set my hand this 23d day of July, 1874.

JOHN W. NEELEY.

Witnesses:
M. M. ROHRER,
A. H. YOUNG.