(No Model.)

F. E. FORSTER.

PETROLEUM BURNER.

No. 473,067. Patented Apr. 19, 1892.

Fig: 1.

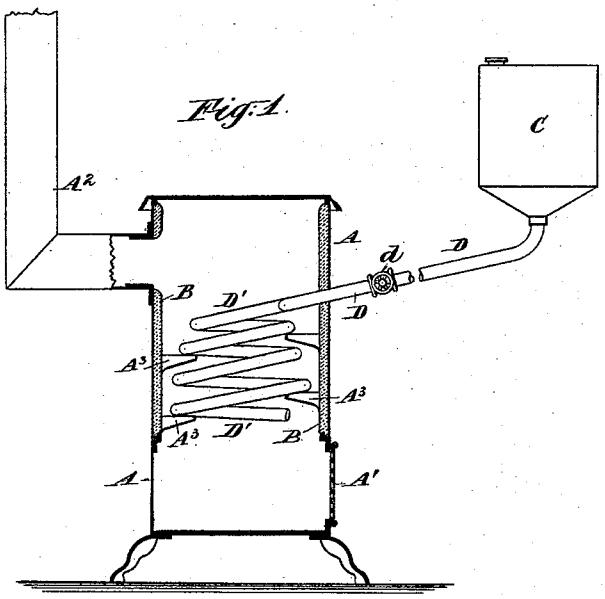


Fig: 2.

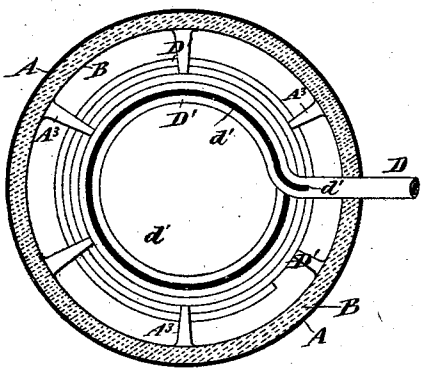


Fig: 3.

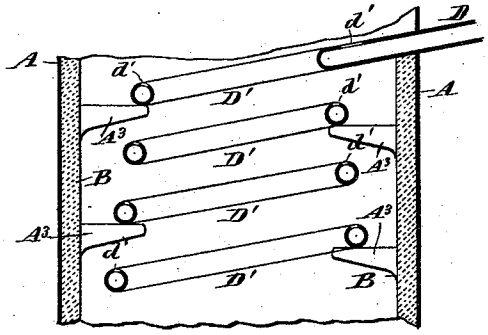
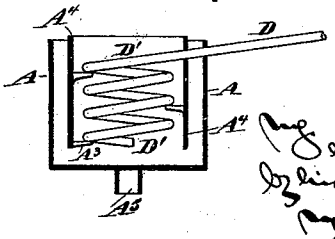


Fig: 4.



Witnesses:
Charles R. Searle,
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Inventor:
by Ferdinand E. Forster
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by Thomas Drew Stetson

UNITED STATES PATENT OFFICE.

FERDINAND E. FORSTER, OF NEW YORK, N. Y.

PETROLEUM-BURNER.

SPECIFICATION forming part of Letters Patent No. 473,067, dated April 19, 1892.

Application filed August 10, 1888. Serial No. 282,440. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND E. FORSTER, of New York city, in the county and State of New York, have invented a certain new and useful Improvement in Petroleum-Burners, of which the following is a specification.

The invention may be used of any size; but it is intended more especially for small burners, such as are required for stoves and analogous heating apparatus for small buildings or small apartments. It may be especially useful on a still smaller scale for torches. The general form of the casing is cylindrical, and it is well to line it with fire-brick, soapstone, or analogous non-conducting material when the apparatus is of large size. I will describe it as being thus constructed. The petroleum is admitted near the top from a slightly-elevated reservoir at any convenient distance. It enters through a pipe of iron or other substantial material adapted to endure heat, which is extended in the form of an open coil, the convolutions of which are of moderate diameter at the top, but grow larger as they descend till they nearly or quite touch the interior of the casing. The upper side of the whole or a large portion of this coil is slotted or perforated, so as to provide a liberal exit for the petroleum either in the fluid condition or in the gaseous. On admitting the petroleum a temporary flame, made in any convenient manner, serves to ignite it. The flame from the petroleum, rising from the lower portion of the coil, bathes the upper portion and raises its temperature. The inclosing casing retains the heat and communicates it somewhat downward, so that the entire coil down to its lowest point is tolerably heated. A cock outside controls the admission of the petroleum. When all is successfully working, the pipe is maintained at such temperature that the petroleum becomes vaporized before it has descended the whole extent.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a side elevation with the casing in section. Figs. 2 and 3 are on a larger scale. Fig. 2 is a horizontal section, and Fig. 3 is a vertical section. Fig. 4 is an elevation showing a modification.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is an exterior casing, of sheet-iron or other suitable material, and B a non-conducting lining, of fire-brick or analogous material.

C is a slightly-elevated reservoir, and D a pipe leading therefrom into the interior of the casing A B, where it is formed into a series of coils D′. A cock *d* controls the flow of the liquid fuel.

Petroleum being supplied to the reservoir C and the cock *d* partly opened to allow a small quantity to flow downward in the open-topped coil D′, a match or other sufficient flame applied at the bottom as soon as it begins to flow will ignite the petroleum at the bottom, and soon the whole is in working order. Then the cock *d* can be adjusted to give the precise amount of heat wanted, and thenceforward it takes care of itself. The entire coil D′, as also the lining B of the casing, will become raised to a high temperature. The petroleum, entering at the top in a liquid condition and being changed into vapor as it advances, tends to cool the upper portion; but this is bathed in the flame from the portion below, and its high temperature is maintained. The lower portion of the casing A B may be arranged in any convenient manner to admit air. I have shown a perforated door A′, which can be conveniently opened to facilitate lighting. The hot products of combustion flow away through a pipe A^2, which may be similar to ordinary stovepipes; but it is preferable to have a considerable length adjacent to the casing A of a material and thickness adapted to endure a high temperature. The interior of the casing A is studded with projections A^3, which extend inward toward the center of the furnace far enough to engage under the coils D′ and contribute to support them.

Instead of lining the casing A with a non-conductor, I propose in some cases to simply make it of two or more thicknesses of iron.

For small stoves and torches I employ an interior casing A^4, Fig. 4, considerably smaller

than the exterior casing. The whole or a large part of the air to support the combustion going on within the inner casing is drawn down from the top through the annular space between the inner and the outer casing.

When the device is to be used as a torch, the base is provided with a socket A^5, Fig. 4, to receive a suitable supporting-stick.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. The conical form of the helix may be increased or diminished. The number of convolutions may be varied. The continuous slot d' may be easily formed by cutting or sawing the pipe longitudinally before bending it to form the spiral coil. This mode of construction is simple and cheap. It is advantageous in several respects. For instance, if the pipe becomes clogged it may be easily cleaned by running a knife-blade or a similar thin flexible tool through the entire length of the slot. If the slot or opening proves to be too large, the pipe may be readily compressed, so as to partially close said slot. This is not feasible when mere perforations or interrupted openings are used.

It is practicable to operate the invention with the openings in the top so much increased in area as to constitute the coil practically a spiral trough. I can dispense with the non-conducting lining B and propose to do so in all the smaller forms of the apparatus. The pipe A^2 will be dispensed with and the products of combustion allowed to flow out directly from the top when the device is used as a torch. Fig. 4 shows the invention applied for such purpose.

Although I have used the term "petroleum" for designating the liquid fuel, it will be understood that oil produced by distillation from coal or rock, alcohol, spirits of turpentine, and other inflammable liquids may be used.

I attach importance to the fact that my coil D′ has its convolutions each distinct from the other, because it allows the air and flame to move freely between each part and the next. My construction is in this feature different from any of the plans where a combustible fluid is burned in a helical channel formed in a continuous case.

I claim as my invention—

1. The combination of a casing A, a spirally-coiled pipe D′, supported therein and having a continuous slot d' in its upper side, and a valved pipe connecting the upper end of said coil with a source of supply of liquid fuel, substantially as and for the purpose herein set forth.

2. The combination, with a casing A, closed at the bottom, of an inner casing A^4, open at both top and bottom and having its lower edge above the bottom of the outer and main casing, the spirally-coiled pipe D′, supported within the inner casing and having a continuous slot d' in its upper side, and a valve-pipe connecting the upper end of said coil with a source of supply of liquid fuel, all arranged for joint operation substantially as and for the purpose herein specified.

In testimony whereof I have hereunto set my hand, at New York city, this 6th day of August, 1888, in the presence of two subscribing witnesses.

FERDINAND E. FORSTER.

Witnesses:

JOS. B. CORWIN,

JOHN W. HEMINGWAY.