F. C. MENSINGA.

Apparatus for Mixing Hydrocarbons with Air and Burning the Same.

No. 209,825. Patented Nov. 12, 1878.

Fig. 1

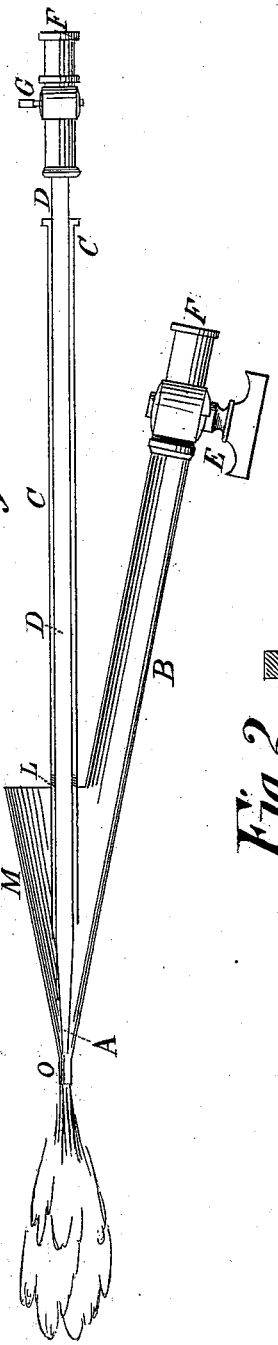
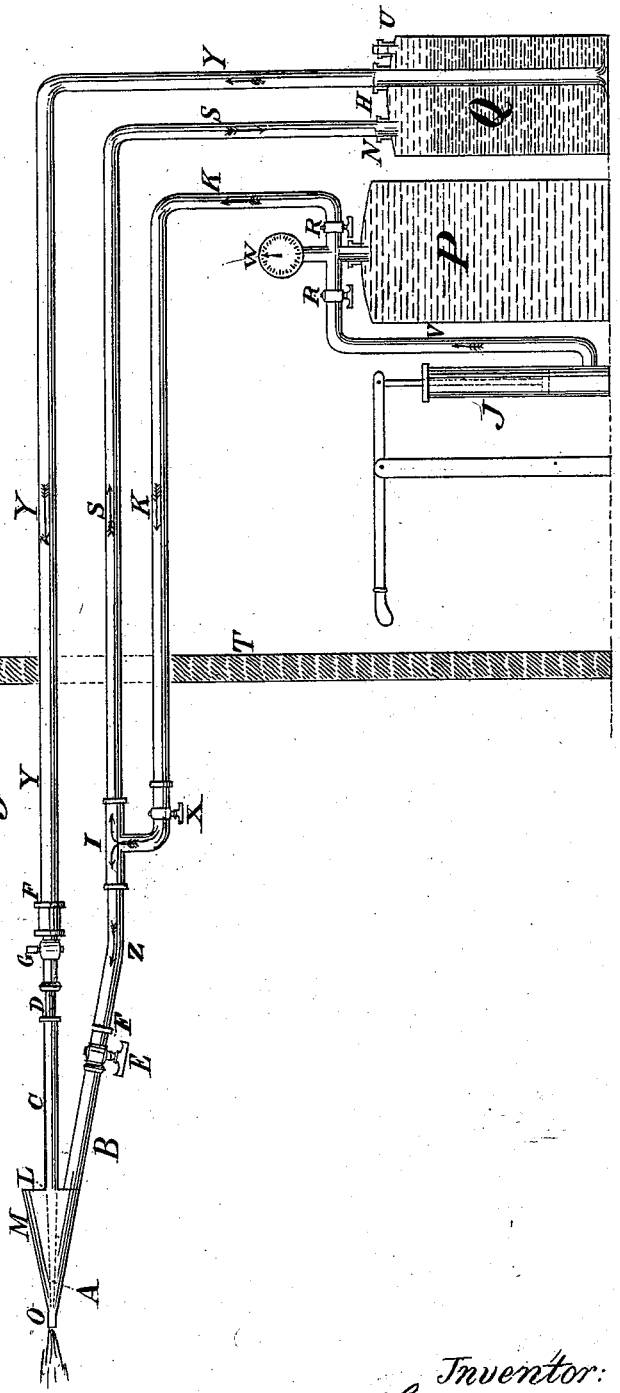


Fig. 2



Attest:
Theo. Sisto
Arthur Palmer.

Inventor:
Frederik C. Mensinga

UNITED STATES PATENT OFFICE.

FREDERIK C. MENSINGA, OF NEW YORK, N. Y.

IMPROVEMENT IN APPARATUS FOR MIXING HYDROCARBONS WITH AIR AND BURNING THE SAME.

Specification forming part of Letters Patent No. **209,825**, dated November 12, 1878; application filed March 12, 1877.

To all whom it may concern:

Be it known that I, FREDERIK CONSTANTYN MENSINGA, of the city, county, and State of New York, have invented a new and useful improvement in devices for forming a mixture of petroleum or of other hydrocarbons with air, and of applying the same to the production of heat, of which the following specification is a full description, reference being had to the accompanying drawings, Figures 1 and 2, forming part hereof.

Similar letters of reference indicate corresponding parts.

This invention relates to the mode of mixing petroleum or other hydrocarbons with air, which mixture I choose to call "hydrocarbon-air mixture," which said mixture, when ignited, furnishes a safe, cheap, and cleanly means of producing and applying heat in any desired quantity, is not a gas, and is not to be confounded with petroleum gas or other explosive gases, nor with spray of petroleum, or of other hydrocarbons, whether such spray is produced through the force of air, of steam, or in any other manner.

The product of my invention is atmospheric air saturated with a hydrocarbon, burns, and is consumed immediately when ignited, and is rather like a fog or mist, which may be blown away, and is of an entirely different nature from either spray or gas.

In my mixture atmospheric air is the essential and main ingredient, the hydrocarbon serving only to saturate such air and thereby render it highly inflammable.

In the accompanying drawings, Figure 1 represents my device for preparing and applying the petroleum-air mixture, with the interior arrangement exposed to view, and this device I choose to call a "mixer." Fig. 2 represents my mixer as connected and in combination, when in use, with reservoirs of petroleum and compressed air, and with other apparatus; and the arrows in said figure indicate the course or direction of the petroleum and compressed air when the apparatus is in use.

In Fig. 1, O represents the orifice or mouth of the mixer, from which the petroleum-air mixture is forced. This orifice may be made of platinum or other material which will resist great heat. B represents a pipe or tube, through which the compressed air is supplied and brought in contact with the petroleum at or near the orifice O.

The petroleum is supplied through tube D, which is a movable pipe or tube incased in another stationary tube, C, in such a manner that it slides easily forward and backward, yet in an air-tight manner, to prevent the escape of air or petroleum, to accomplish which purpose said tube D is oiled, and is wrapped or enveloped with an air-tight packing of rubber or other material at or near L—the junction of the stationary tube C with the body of the mixer M, which is a funnel or other shaped hollow pocket or receiver, which is filled with the compressed air coming through the pipe B. The tube D may also be provided with a point of platinum or other infusible material, A, to prevent it from melting.

E represents a cock to regulate the supply of compressed air, and G a cock to regulate the supply of petroleum. F represents the points of connection of the mixer with other apparatus when in use, and may be provided with screw-threads for that purpose.

It may be necessary to place at the extremity toward F of the tube C an adjustable screw or bridge, connecting the tubes C and D, whereby the mixer may be firmly held in the desired position on the tube D, so that the pressure of the compressed air flowing through B may not force the mixer forward.

In Fig. 2, P represents a reservoir for holding compressed air, which is supplied by means of an ordinary forcing-pump, J, through a pipe or tube, V, which is provided with two cocks, R, by means of which the air may be confined or not, as desired. W represents a manometer, connected with the tube V and the reservoir P, to indicate the pressure of the air. Q represents a reservoir for holding the petroleum, which is supplied through the orifice or opening U.

The compressed air in the reservoir P is conveyed, in the first instance, through the pipe or tube K, which is provided with a cock, X, by means of which the supply of compressed air may be regulated.

At I the course of the compressed air flowing through K is divided in two directions—

in one through the pipe or tube Z to B, in the other direction through the pipe or tube S at the connection N to the petroleum-reservoir Q.

The petroleum is conveyed from the petroleum-reservoir by means of the pipe V through the opening H to D.

All or any of the connecting-pipes may be of metal, rubber, or other suitable material; but the pipe Z must be made of some flexible material, or else of adjustable metal pipes, so that the mixer may be slightly moved forward or backward, if desired, after the mixer is connected with the other apparatus at F.

When in action the petroleum is forced upward through the pipes Y and D by means of the compressed air, which flows into the reservoir Q through S to the orifice A, where it is met by the compressed air flowing through Z and B, and is mingled therewith, which mixture, after forcing its way through the small orifice O, is reduced to an impalpable mist or fog, which may then be ignited and applied to the object to be heated. The intensity of the heat may be regulated by increasing or diminishing the supply of petroleum-air mixture by means of the cocks, while the proper mingling of the petroleum with the air at A may be effected by slightly moving forward or backward the mixer.

The pressure of air in the petroleum-reservoir and in the mixer must be kept about the same, for too much pressure in the mixer would prevent the petroleum from coming forward through the pipe D, and too much pressure in the reservoir Q would flood the mixer, thereby preventing the proper action of the compressed air coming through the pipe B at the orifice O. This may be easily regulated by means of the various cocks.

It will be advisable in most instances to separate the space containing the reservoirs P and Q and their connecting parts from the balance of the apparatus by means of a partition or wall, T, Fig. 2, of stone, metal, or other non-inflammable material, both as a precaution against fire from the burning petroleum-air mixture and to prevent the escaping heat of the latter from affecting the petroleum and compressed-air reservoirs.

The forcing-pump J will in the first instance have to be worked by hand; but in cases where the heat is applied to the production of motive power, the latter may, through a suitable arrangement, be connected with the pump J, or made to compress air in some other way, and thus supply the reservoir P.

In its application, my invention will be found useful for heating purposes in general, and, among others, for boilers, steam-engines, cars, locomotives, steamboats, &c., as well as in the various industrial and mechanical arts, like blacksmithing, plumbing, smelting, &c.—in short, wherever safe, cheap, and cleanly fuel is desired.

The following are among the advantages of my invention; that through it the intensity of the heat may be easily and speedily regulated and graded at any time in any degree, or instantaneously cut off, by simply regulating the supply of petroleum-air mixture. Cleanliness and cheapness. It does not produce any smoke nor leave any ashes, cinders, or dirt, as the petroleum-air mixture is wholly self-consuming; it requires little or no attention in the way of kindling, &c., after the apparatus is once started. Its great saving of valuable room, as in steamboats, &c., where, in place of bulky quantities of coal and wood, in my invention only a comparatively small space is needed for storing the necessary quantity of petroleum. Its safety, not only by reason of not producing sparks, but also by reason of its non-explosiveness, for in my invention the pressure of the compressed air on the petroleum in the petroleum-reservoir will prevent the expansion and development of gases.

The basis of the fire in my invention is not explosive gas, but petroleum-air mixture, as herein described, which, in burning, is instantaneously consumed.

In the preceding part of this specification of my invention I have confined myself to petroleum as one of the principal ingredients therein, because that oil is probably the cheapest and adapted in my invention to the greatest variety of uses; but should it be found advisable, for some or all purposes, to substitute some other oil or liquid, like alcohol, turpentine, camphene, or other hydrocarbon in the place of petroleum, such substitution may be easily made without substantially varying my invention.

I claim as my invention—

1. In a hydrocarbon-air mixer or vaporizer in which a jet of petroleum or other hydrocarbon is forced into or through a surrounding compressed-air current, the combination of the mixer or burner, the tube B, provided with stop-cock E, rigidly connected to the mixer, and communicating with the compressed-air reservoir by a flexible tube, the tube C, rigidly connected with the mixer, and the tube D, provided with stop-cock G, leading from the oil-reservoir through the tube C to the mixer, whereby the latter is made adjustable and the supply of air and oil is regulated, substantially as described.

2. The combination, with the mixer, having connections as described, of the compressed-air reservoir, the air-pipes K and S, the coupling I, and the oil-reservoir, whereby the air is furnished to the mixer and oil-reservoir simultaneously, substantially as described.

FREDERIK C. MENSINGA.

Witnesses:
ARTHUR PALMER,
EDWD. E. WATERS.