No. 724,008. PATENTED MAR. 31, 1903.

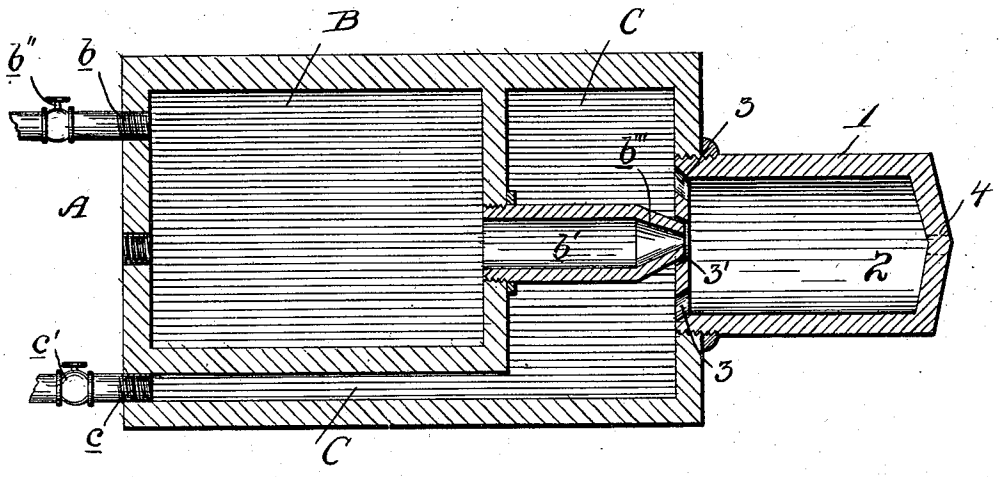
J. F. HIGGINS.

HYDROCARBON BURNER.

APPLICATION FILED MAR. 21, 1902.

NO MODEL.

Fig. 1.



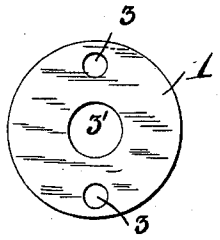


Fig. 2.

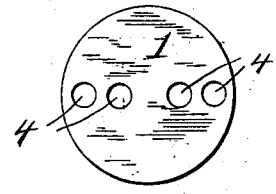


Fig. 3.

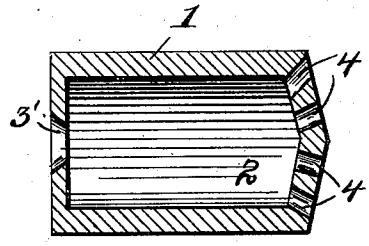


Fig. 4.

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UNITED STATES PATENT OFFICE.

JAMES FRANKLIN HIGGINS, OF CORSICANA, TEXAS.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 724,008, dated March 31, 1903.

Application filed March 21, 1902. Serial No. 99,285. (No model.)

To all whom it may concern:

Be it known that I, JAMES FRANKLIN HIGGINS, a citizen of the United States, residing at Corsicana, in the county of Navarro and State of Texas, have invented certain new and useful Improvements in Hydrocarbon-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved burner designed primarily for use with oils, whether of a crude or residuum character, and more particularly to that class of such burners provided with a nozzle the interior of which is utilized as a mixing-chamber for the oil and steam.

The invention embraces the idea of providing a nozzle the inlet and outlet apertures of which are arranged out of alinement or in dissimilar planes, so that the fluids or vapors entering the inlet-apertures will be directed against the interior walls of the nozzle and be sprayed back, so that a more efficient commingling of the same previous to the discharge from the nozzle will be effected.

The invention further contemplates the provision of a nozzle provided with inlet and outlet apertures, the steam-inlet apertures being of such a character and disposed relative to the oil-inlet so that the steam when fed thereto will be caused to cross the path of the oil, and thus effect a quick and thorough mixing of the two fluids.

The invention also relates to the provision of a nozzle having suitable inlet-apertures and a plurality of discharge-apertures so arranged as to distribute the fuel discharged therefrom over a relatively large area, whereby the objections incident to the employment of a burner having a discharge in a single direction only—*i. e.*, the concentration of the heat to a relatively confined area—is overcome.

Novel details in the construction and operation of the burner will be apparent from the detailed description hereinafter when read in connection with the accompanying drawings, forming part hereof.

In the drawings an embodiment of the invention is illustrated, and when hereinafter referring to the same like reference characters will refer to corresponding parts in the several views.

Figure 1 is a vertical longitudinal sectional view of the burner and nozzle. Fig. 2 is an elevation of the receiving end of the nozzle. Fig. 3 is a corresponding view of the discharge end of the nozzle, and Fig. 4 is a horizontal longitudinal sectional view of the nozzle.

Referring more specifically to the drawings, A designates a casing the interior of which is formed with an oil-chamber B and a steam-space C. The oil-chamber occupies the upper and rear portion of the casing, and the steam-space is located below the oil-chamber and also between the end of the same and the nozzle end of the casing. The oil-chamber is provided with an inlet *b* and an outlet-nipple *b'*, and the steam-space is provided with an inlet *c*. Oil enters the chamber B through the inlet *b* from any suitable source of supply, and steam simultaneously enters the space C through the inlet *c*, also from any suitable source. The steam passing beneath and around the end of the oil-chamber initially heats the oil therein.

Those features of the burner just described are not of the essence of the present invention and will consequently not be claimed herein, as they constitute subject-matter of a companion application, Serial No. 70,306, filed July 30, 1901.

The only means necessary to control the supply of oil or steam to or through the burner are the valves *b''* *c'*, respectively, in the supply-pipes leading to the oil-chamber and the steam-space.

1 designates the nozzle, preferably of cylindrical construction and having inner and outer end walls and the hollow interior of which constitutes the mixing-chamber 2. The nozzle is provided at its receiving end with apertures 3 and 3', formed in the inner end wall, which constitute inlets into the mixing-chamber 2. The apertures 3 and 3' lead into the mixing-chamber 2 in diversified directions. The nozzle is provided at its discharge end with apertures 4, formed in the outer end wall, which constitute outlets from the mixing-chamber 2. The apertures 4 are so formed that they lead from the mixing-cham-

ber 2 in diversified directions. In the embodiment of my invention which is illustrated in the drawings the apertures 3 and 3′ are disposed in substantially vertical alinement, and the directions of their entrance into the mixing-chamber 2 are such that the jets of oil and steam entering through them converge toward a common center in the said mixing-chamber, and the outlet-apertures 4 are arranged in substantially horizontal alinement, with the directions of their departure from the mixing-chamber 2 such that the mixed oil and steam are forced out in a horizontal plane spreading from the discharge end of the nozzle. The steam passes through the steam-space C into the nozzle 1 through the apertures 3 and 3′. The end b''' of the nipple b' fits into the aperture 3′ in such a manner that it does not occupy all this aperture; but space is left between the periphery of the end b''' and the wall of the said aperture 3′. Thus the steam entering the mixing-chamber 2 through the aperture 3′ creates a vacuum and draws the oil from the chamber B out through the nipple b'. The peculiar arrangement of the steam-inlet apertures 3 3′, as stated, causes the steam to be directly thrown against or across the oil-jet, so that the two fluids are commingled to a greater or lesser extent immediately upon their admission to the mixing-chamber, and by disposing said apertures 3 3′ so that none of the same is directly opposite any of the discharge-apertures 4 the oil and steam are directed against the walls of the nozzle and sprayed back previous to final discharge, whereby thorough mixing is facilitated.

It will be appreciated that in the burner above defined there are no interior movable parts, which might perchance become loose and require repairing or seriously impair the usefulness of the burner.

It is to be understood that many changes may be made in the construction and arrangement of the several details of construction disclosed herein without in the least departing from the nature and spirit of the invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. A nozzle for hydrocarbon-burners, comprising a mixing-chamber, formed with inlet-apertures at one end leading into the mixing-chamber in a plurality of directions and arranged in substantial alinement and with outlet-apertures at its opposite end leading from the mixing-chamber in a plurality of directions and arranged in substantial alinement, said inlet and outlet apertures being arranged in series occupying planes intersecting each other, whereby the fuel discharged into the mixing-chamber is caused to spray backward previous to its discharge from the nozzle, substantially as and for the purposes described.

2. A nozzle for hydrocarbon-burners, comprising a hollow interior constituting a mixing-chamber, formed with a plurality of inlet-apertures at one end thereof arranged in approximate alinement and with a plurality of outlet-apertures at its opposite end arranged in approximate alinement, said inlet and outlet apertures being arranged in planes intersecting each other, whereby the fuel discharged into the mixing-chamber is caused to spray backward previous to its discharge from the nozzle, substantially as and for the purposes described.

In testimony whereof I affix my signature in the presence of two witnesses.

JAMES FRANKLIN HIGGINS.

Witnesses:

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WM. B. THOMAS.