

1,005,958.

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UNITED STATES PATENT OFFICE.

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HYDROCARBON-BURNER.

1,005,958.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES E. GLAFKE, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

My invention relates to that class of hydro-carbon burners in which liquid hydro-carbon fuel is burned by the aid of steam which atomizes the liquid hydro-carbon within a mixing chamber and projects the fuel through a port into the fire box; and the object thereof is to produce a burner in which the flow of fuel is automatically regulated by the boiler pressure.

I accomplish this object by the mechanism described herein and illustrated in the accompanying drawing which is a side elevation partly in longitudinal central section of my improved burner.

In the drawings 5 is the casing of a combined expansion and mixing chamber 6 to the outer end of which is secured tip 7 having outlet port 8 in the outer end thereof. Casing 5 is preferably removably attached to the casing 9 of the vacuum chamber 10 by union coupling 11. A liquid hydro-carbon fuel pipe 12 opens into the vacuum chamber at a point between the combining tube 13 and the jet tube 14, which tubes form an injector. The pet tube and combining tube are in alinement and are adjustably secured in webs so that the distance between the two may be regulated. The casing of the vacuum chamber is connected to casing 15 of the steam chamber 16, which is supplied with steam by pipe 17 which is connected to the steam boiler, not shown, in the usual well known manner. The steam pipe ends in a closed end 17^a within chamber 16, and is provided with ports 18 and 19, which are in alinement with the longitudinal diameter of the steam chamber. These ports are controlled by valves 20 and 21, which are connected and form a balanced valve, and are provided with a stem 22 which is rigidly secured to the center of a circular diaphragm 23 mounted in the diaphragm chamber 24. The casing 25 of the diaphragm chamber is connected to the casing of the steam chamber. The diaphragm chamber is separated from the steam chamber by web 26 through which web stem 22 passes. A spring cage 27 is

connected to the back portion of the diaphragm chamber and has mounted therein a follower 28 and a spring 29. One end of spring 29 bears against the follower and the other end bears against a bearing plate 30 secured upon the back of the diaphragm. A regulating screw 31 passes in threaded contact through the end of the spring cage and bears against the follower therein. By means of this screw the tension of the spring is regulated. The diaphragm chamber has a port 32 therein which opens in front of the diaphragm and is connected by pipes 33 with the steam space of the boiler.

In operation the steam pipes would be connected up to the steam space of the boiler under which the burner is to be used. Pipe 12 would be connected to a suitable crude oil supply situated at a point below the burner when in use but within the suction power of the steam injector. Screw 31 is then moved so as to open the balanced valve to admit a sufficient supply of steam into the steam chamber to operate the injector to draw the required amount of oil into the burner to produce the desired fire. When the steam pressure rises above the point at which the tension of spring 29 is set it will overcome the tension thereof and will force the diaphragm to cause the partial closing of the balanced valve, thereby causing the flow of steam through the injector to be reduced, thus lessening the suction on the oil and reducing the flame. As soon as the steam pressure falls below normal the pressure on the diaphragm is relieved and the spring forces the balanced valve to again open, thereby automatically regulating the flow of the fuel by the steam pressure of the boiler. This construction at all times maintains the balance or ratio between the steam and the oil, thus making a clean and smokeless fire at all stages.

Having described my invention what I claim is:

A hydro-carbon burner comprising a mixing chamber having an outlet port; an injector comprising a combining tube opening into said mixing chamber and a jet tube in alinement with the combining tube and at the rear thereof; a liquid fuel supply pipe connected to said injector at a point between said tubes; a steam chamber connected to the jet tube of the injector; a steam pipe opening into said steam chamber, having a closed end and two ports in

alinement with the injector jet; a balanced
valve controlling said ports; a diaphragm
chamber connected to said steam chamber
and having a web separating the two cham-
bers; a diaphragm in said diaphragm
chamber; a stem passing through said web
and connected at one end to the balanced
valve and at the other end to the dia-
phragm; a spring cage connected to the
back of the diaphragm chamber; a follower
in said cage; a spiral spring between said
follower and said diaphragm; a regulating
screw projecting through the end of said
cage and engaging said follower; and means
to supply steam from the boiler under
which the burner is used to the diaphragm
chamber in front of the diaphragm.

In witness that I claim the foregoing I
have hereunto subscribed my name this 25th
day of January, 1910.

CHARLES E. GLAFKE.

Witnesses:

FLORA HALL,
CHRISTIE O. BARIM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."