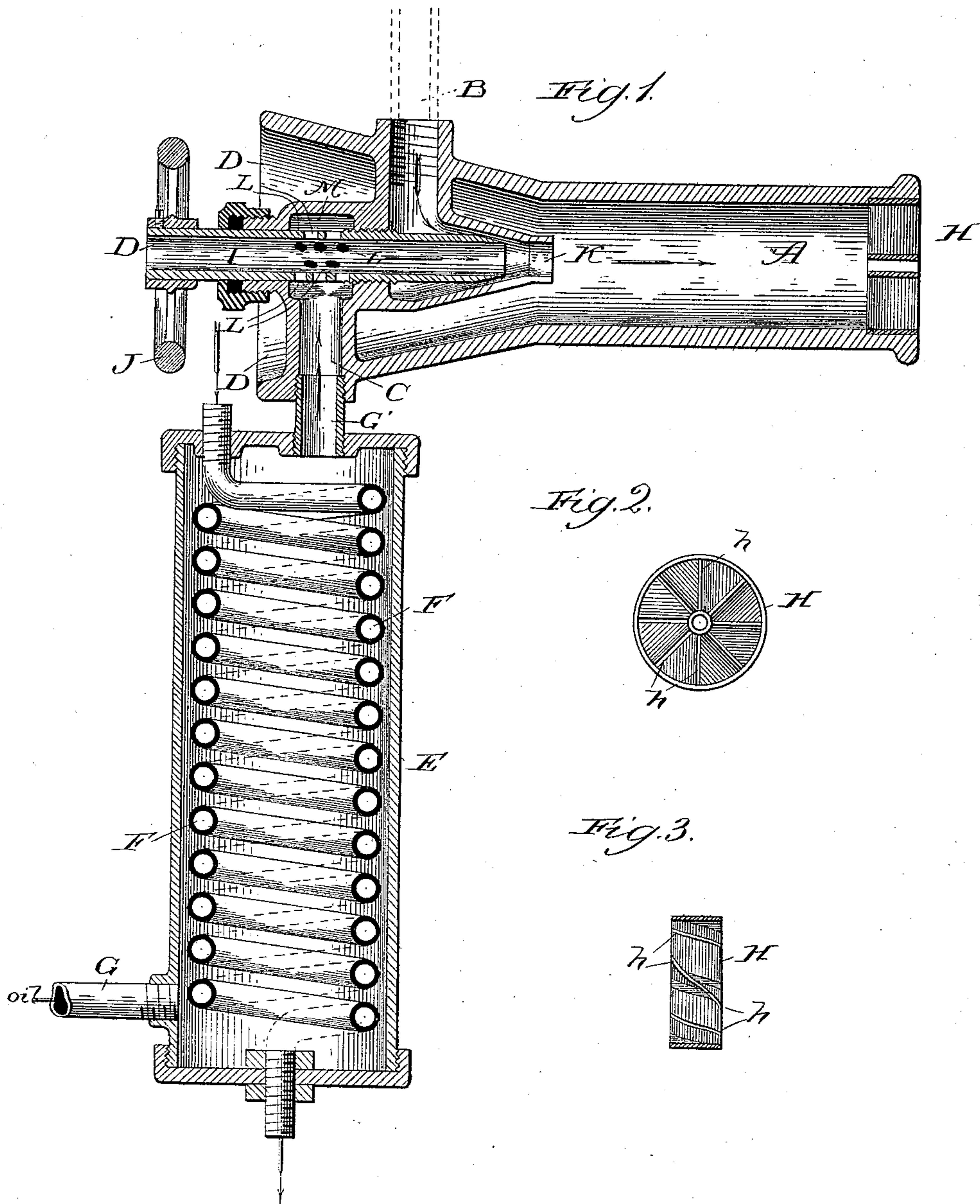


(No Model.)

J. NICHOLS.
HYDROCARBON BURNER.

No. 451,161.

Patented Apr. 28, 1891.



Witnesses:

E. E. Gaylord.
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UNITED STATES PATENT OFFICE.

JOSIAH NICHOLS, OF CHICAGO, ILLINOIS.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 451,161, dated April 28, 1891.

Application filed September 7, 1889. Serial No. 323,277. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH NICHOLS, a citizen of the United States, residing at Chicago, Illinois, have invented a new and useful Improvement in Hydrocarbon-Burners, of which the following is a specification.

The object of my invention is to provide a simple and economical vapor-burner; and my invention consists in the features and details of construction hereinafter described and claimed.

In the drawings, Figure 1 represents a vertical longitudinal section of a vapor-burner embodying my improvements; Fig. 2, a plan view of the fan-blades used to twist the vapor, &c.; and Fig. 3, a side elevation of Fig. 2 with a portion of the circumference cut away.

A is the mixing-chamber; B, the steam-inlet; C, the oil-inlet; D D, air-inlets; E, the heating-chamber; F, a coil of pipe therein; G, an oil-pipe leading to the heater; G', a pipe leading from the heater to the vapor-burner; H, the twisting device, and *h* the blades thereof.

In constructing my improved burner I make of suitable material a chamber A. This is provided at points, preferably near the rear end thereof, with the steam-inlet pipe B and an oil-inlet pipe C. These consist, preferably, of pipes or tubes made integral with and opening into the chamber A and connecting with each other, as shown in Fig. 1. The chamber A is open at the rear end to allow of the admission of air.

I next construct the tube or pipe I. This is inserted at the rear end of the chamber A and passed inside the oil and steam chamber, and is provided with screw-threads meshing with similar threads on the inside of the steam-chamber, whereby the air-tube may be moved backward or forward. The steam-inlet is beveled on the interior at the point near where the steam issues therefrom into the chamber A, and the pipe I is beveled upon its exterior, so that as it is screwed back and forth by means of a suitable hand-wheel J the size of the opening through which the steam is to issue may be increased or diminished at pleasure. The tube I is open at both ends, and the force of the steam passing

through the opening K will act as a siphon to draw air in through the end of the tube I. When this tube I is screwed into place, it cuts off direct communication between the steam-inlet and the oil-inlet, and therefore to allow of the passage of oil I provide the tube with a number of holes or perforations L, through which the oil may pass.

I next construct what I term the "heater." This consists of a cylindrical chamber of any suitable dimensions and closed with a screw-cap at either end. Inside of this I provide a coil of pipe connected with the boiler to allow steam to pass through the same. The end of this coil projects out at the lower end of the heater and the water of condensation may be allowed to pass off in this way. The oil is introduced into the heater by means of the pipe G and passes by means of another pipe G' from the heater into the burner, though the pipe G' may of course be omitted and the heater attached directly to the burner.

I then construct what I have denominated a "twister." This consists of a flat ring H, preferably made of brass and of suitable diameter to fit closely in the front end of the burner. This ring is provided with a series of radial blades *h*, which, as shown more particularly at Fig. 3, are made twisting or curving, like the blades of a screw or of a fan-wheel, so that as the mixture of steam, air, and vapor passes out of the burner it will be given a swirling or rotary motion and be thoroughly mixed and distributed in the fire-chamber.

In operation the front end of the burner is inserted into the fuel-door; or, if desired, a door may be made provided with an opening, through which the muzzle of the burner may pass into the fire-box, the burner being attached to the outside of the door and swinging with it. Steam is then introduced through the pipe B, and passing out through the opening K draws air through the pipe I and oil through the inlet C. The oil and steam and air pass into the chamber A, and, mixing therein with additional air drawn through the rear end of the burner, pass through the twister into the fire-chamber, where the mixture may be ignited and burned. Steam is also admitted from the boiler into the coil F, so that the oil contained

in the chamber E may become heated before entering into the burner, thus facilitating the vaporizing thereof. Any vapor which may be formed in the heater itself will pass up
5 into a chamber M, formed in the upper part of the oil-inlet above the pipe I, and then entering through the holes L will pass along the upper side of the tube I into the chamber A without disturbing the even flow of oil through
10 such tube.

I claim—

In a vapor-burner, the combination of a mixing-chamber A, open at its rear end for

the admission of air, a steam-inlet pipe B and an oil-inlet pipe C integral with such
15 chamber, an air-inlet tube I, connected by suitable perforations with the oil-inlet tube and moved in one direction or the other to increase or diminish the size of the steam-inlet, and a heating-chamber E, connected with the
20 oil-inlet pipe, substantially as described.

JOSIAH NICHOLS.

Witnesses:

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