

(No Model.)

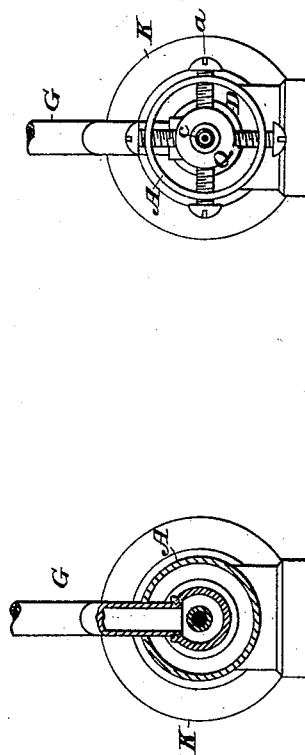
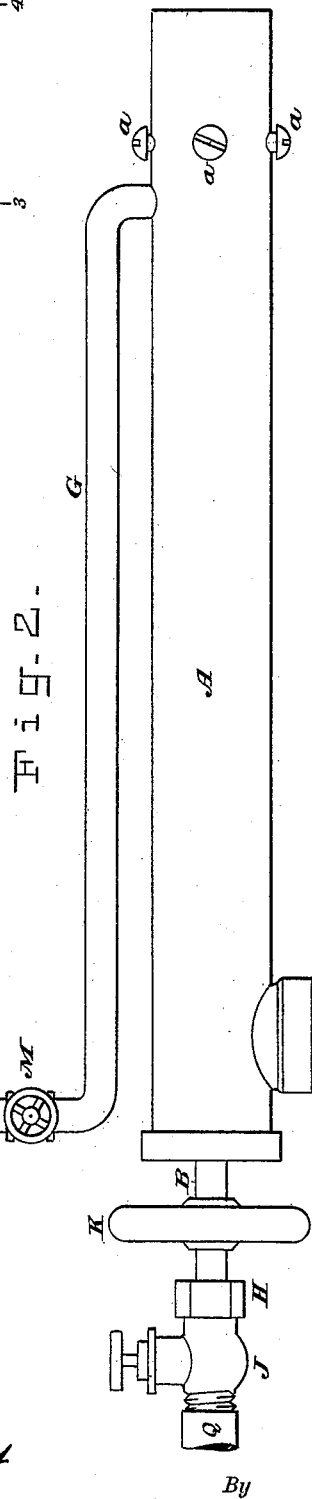
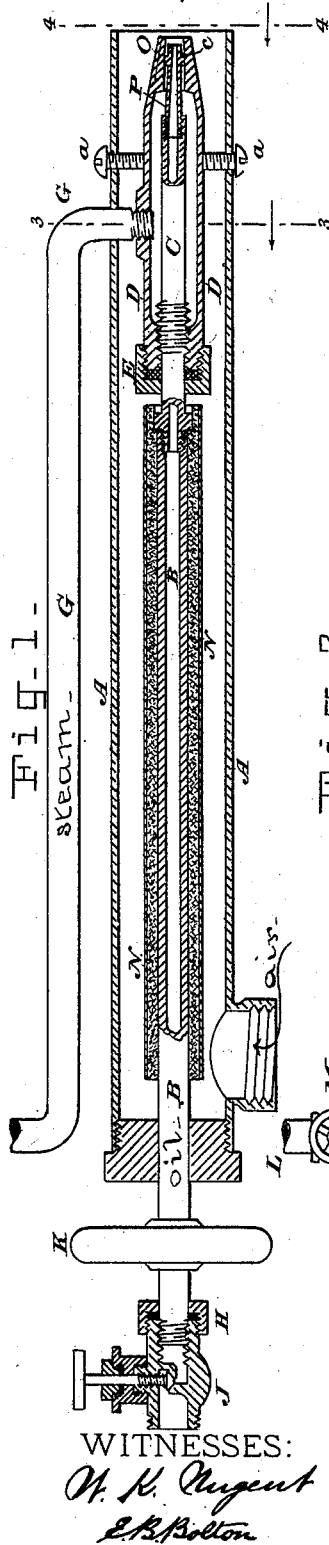
2 Sheets—Sheet 1.

W. C. JAEGLE.

INJECTOR BURNER FOR HYDROCARBON OILS.

No. 420,411.

Patented Jan. 28, 1890.



INVENTOR:

Wm. C. Jaegle

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his Attorney.

(No Model.)

2 Sheets—Sheet 2.

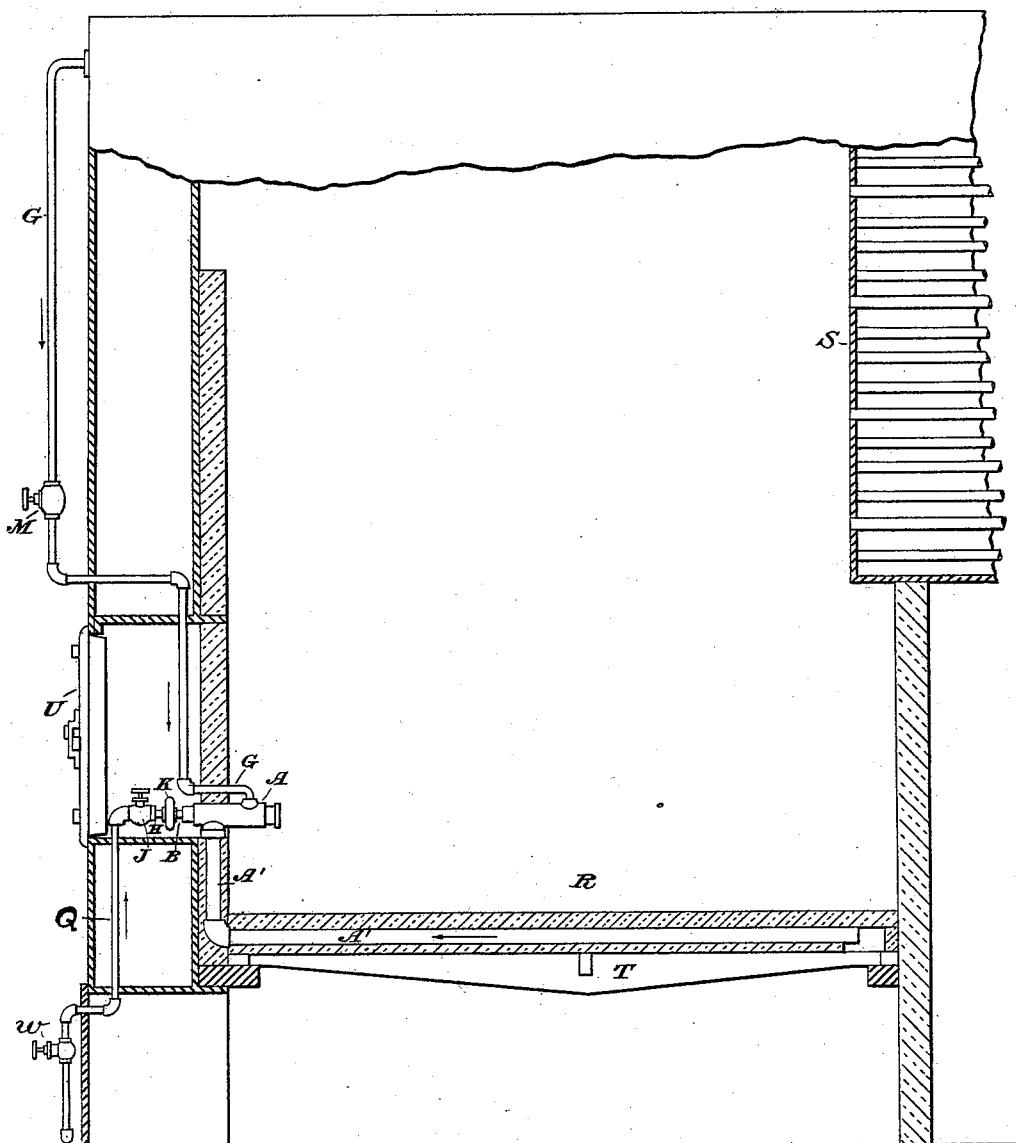
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Fig. 5.



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UNITED STATES PATENT OFFICE.

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INJECTOR-BURNER FOR HYDROCARBON OIL.

SPECIFICATION forming part of Letters Patent No. 420,411, dated January 28, 1890.

Application filed December 19, 1888. Serial No. 294,133. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. JAEGLE, of Hicksville, in the county of Queens and State of New York, have made certain new and useful Improvements in Injector-Burners for Hydrocarbon Oils and Gases; and I hereby declare the following specification to be a full and clear description of the same, reference being had to the annexed drawings, making a part hereof.

My invention relates to that class of apparatus by which hydrocarbon oils may be economically used as a fuel under boilers for generating steam, in furnaces, and for burning lime in limekilns and bricks in brickkilns.

The object of my invention is to produce a more perfect combustion of the gases by providing improved means for a ready adjustment of the relative positions of the oil and steam outlets to each other and a free movement of the different parts of the apparatus at the point where the steam and oil are discharged, so as to clear dirt obstructions; and I also design to prevent the formation of carbon in the oil-pipe by proper protection thereof from excessive heat.

In the drawings, Figure 1 shows a longitudinal section of my improved burner. Fig. 2 is a side view of the same. Fig. 3 is a cross-section through the line 3 3 of Fig. 1. Fig. 4 is an end view on the line 4 4 of Fig. 1. Fig. 5 is a view of a portion of a steam-boiler and fire-box, with my burner shown placed in position for use.

In apparatus designed for the burning of hydrocarbon oil great difficulty is experienced in preventing the accumulation of substances which obstruct the passage of the oil and steam, and also where the burner is of any length in preventing the steam leaking into the oil-chamber, thereby obstructing the proper flow of oil and causing unequal combustion.

The style of burner to which my invention applies is that construction in which the oil is discharged through a single small straight central hole in the oil-nozzle, and the steam

passes out through a straight annular opening surrounding the oil-nozzle.

In apparatus of this kind great care is required in having the proper proportions of oil and steam supplied at the point of combustion. As the fire reaches greater intensity the supply of steam should be increased, and as the quantity of steam is increased the position of the central oil-exit should be changed in relation to the end or outlet of the steam-pipe, or complete combustion will not be obtained. The condition of the steam also often varies, and this requires that the relative position of the oil-nozzle should be changed. When the steam is used in a superheated state, the relative position of the central outlet of the oil-nozzle to the end of the surrounding steam-nozzle must be nicely adjusted.

One of the principal objects of my invention is to provide the oil-tube with a free circular central opening or nozzle, which may be adjusted to different relative positions with the surrounding steam-outlet while the burner is in operation and without necessarily altering or interfering with the quantity of steam and oil flowing through their respective outlets.

In the drawings, A represents an exterior casing or pipe through which air is allowed to pass.

B is a pipe for conducting oil, which passes into the interior of the casing A and is connected with an oil-tube C, entering the steam-chamber D through a stuffing-box E. The oil-tube C is provided with an oil-nozzle P, which passes through the steam-nozzle O or outlet for the steam from the steam-chamber D. The opening in the oil-nozzle P is circular and in the center thereof. It should be about one-eighth ($\frac{1}{8}$) of an inch in diameter and a true bore for some distance from the end or outlet. The oil-nozzle should fill up the bore of the steam-nozzle O, except an annular opening of from one thirty-second ($\frac{1}{32}$) to one-sixteenth ($\frac{1}{16}$) of an inch.

The steam-chamber D is located at or near the open end of the casing A and is held in

position in the center of the casing by set-screws *a a* or other convenient means which will allow the free passage of air through the casing A.

5 Steam is supplied to the steam-chamber D by the pipe G.

The oil-nozzle P is provided with offsets or projections *c* near its extremity, which secure its being always in the center of the steam-
10 nozzle or outlet O of the steam-chamber.

The oil-tube is firmly secured to the oil-pipe B and turns with it, and, being threaded in the rear of the steam-chamber, will move forward or backward as the oil-pipe is turned,
15 and thus regulate the relative positions to each other of oil and steam outlet.

The oil-vent P may be made a part of the oil-tube C, if so desired.

The oil-pipe B passes through an opening
20 in the rear of the casing A and terminates in a stuffing-box H, where it connects with the needle-valve J, which is at the end of the oil-supply pipe Q.

The oil-pipe B is provided with a wheel K
25 for convenience in turning it.

The steam-pipe G may be extended to the front of the casing A or into the fire-box, if desired, so that the steam passing through it will become superheated before passing
30 through the steam-chamber.

In Fig. 5 the arrangement of burner in fire-box and manner of supplying heated air is shown. A' is a pipe which leads from the back of the fire-box to the burner and receives a supply of air from the ash-pit or other convenient place. The pipe A' rests upon or is inclosed by fire-brick R, laid on the grate-bars T; or the bricks themselves may be laid so as to take the place of the
35 pipe A' and form a passage for hot air. The steam-supply pipe L is connected with the boiler and is provided with a steam-valve M for turning on and off and regulating the supply of steam.

45 In order to protect the hydrocarbon oil flowing through the oil-pipe B from the excessive heat which is liable to produce carbon therein and obstruct the flow where the burners are of considerable length, as is the case in those used for limekilns, I provide the
50 pipe B with a packing of asbestos or other non-conducting material, which is represented by the letter N.

In operating the device the oil-valve is
55 opened, so as to allow a small portion of oil to pass through the oil-tube, and the steam is turned on and regulated at the valve M. The

gases formed at the mouth of the burner are ignited. The flow of oil may be then increased or diminished by turning the needle-valve 60 J, and the proper mixing of the steam and oil regulated and obtained by the position of the outlet of the oil-nozzle P in the steam-nozzle O, which is readily adjusted backward or forward by turning the wheel K without 65 stopping the fire or necessarily interfering with the flow of oil and steam. Scales and obstructions often lodge in the steam-nozzle and interrupt the flow of steam. These obstructions are readily removed by working 70 the oil-nozzle backward or forward until the passage is cleared. A good result may be obtained in some cases without the exterior casing A, in which case the steam-chamber should be secured in position in the furnace 75 or fire-box and the oil-pipe B sufficiently covered and protected from the excessive heat where it extends inside the furnace.

What I claim as my invention, and desire to secure by Letters Patent, is— 80

1. In a burner for hydrocarbon oils, the steam-supply pipe and chamber D, having nozzle O, the inner sides of which are formed of straight parallel walls, in combination with the inner concentric oil-tube C, having nozzle 85 P, said inner oil-nozzle conforming to the inner walls of the steam-nozzle O, and means for adjusting said inner nozzle, whereby a straight annular passage is maintained between the inner and outer nozzles, as and for 90 the purposes shown and described.

2. In a burner for hydrocarbon oils, the central oil-pipe B, stuffing-box H at the outer end thereof, valve J, and wheel K, the oil-pipe B, terminating in oil-tube C, having nozzle 95 P, in combination with the steam-supply pipe and chamber D, having nozzle O, the inner sides of which are straight parallel walls concentric to the outer circumference of the nozzle P, substantially as and for the purpose 100 shown and described.

3. In a burner for hydrocarbon oils, the hot-air tube or casing A, steam-chamber D, connected with steam-supply pipe, in combination with the adjustable oil-pipe B, carrying 105 tube C and nozzle P, and passing centrally through and out of the rear of said casing A, and connected with the oil-supply pipe, substantially as shown and described.

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Witnesses:

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