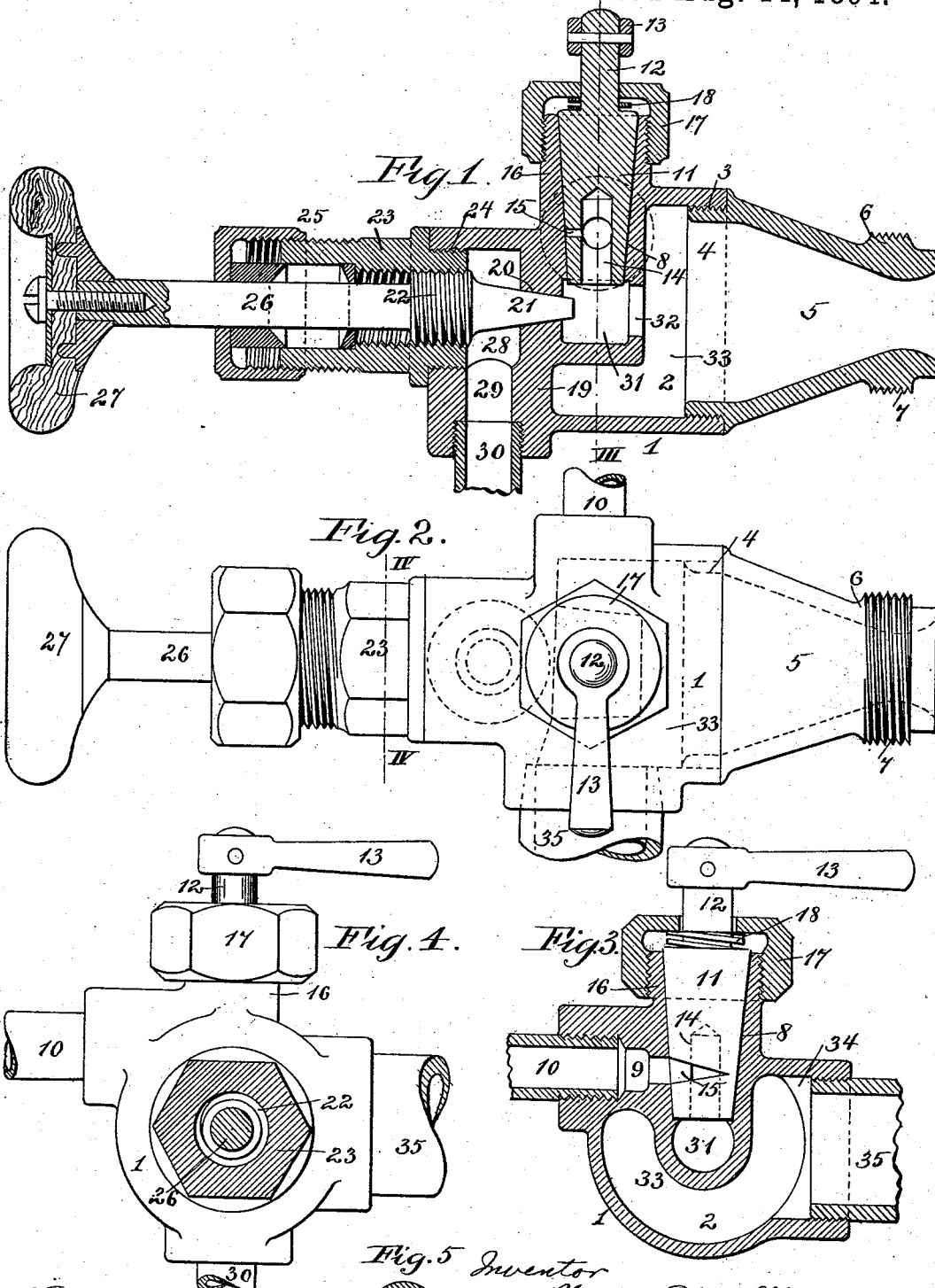


(No Model.)

W. B. WRIGHT.
INJECTOR BURNER.

No. 524,369.

Patented Aug. 14, 1894.



Witnesses
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UNITED STATES PATENT OFFICE.

WALTER BLAKE WRIGHT, OF CHICAGO, ILLINOIS.

INJECTOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 524,369, dated August 14, 1894.

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To all whom it may concern:

Be it known that I, WALTER BLAKE WRIGHT, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Injector-Burners; and I do 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.

My present invention relates to that class of liquid fuel or injector burners in which a vapor formed of a mixture of air, steam and liquid hydro-carbon volatilized is forced in a jet or stream into a furnace or other chamber which it is desired to heat.

The objects of my improvements are, to produce a burner of improved construction in respect of the simplicity of its parts and the cheapness with which they may be manufactured; to obviate the difficulty heretofore encountered in the frequent clogging of the orifice of the burner through which the oil is supplied, due to the occurrence of solid particles or particles of a semi-liquid character in the oil, which cause the cessation of the flame, and requires the frequent cleaning and relighting of the apparatus in many cases; to provide means for the complete mixture of the oil and steam before the hot air is added, resulting in the production of a better gas of a greater heating capacity; to provide a convenient means for the attachment of the burner to the furnace, which at the same time prevents any oil of condensation from running down and out upon the body of the device; and to effect other useful results hereinafter more particularly set forth.

With such objects in view my invention consists in the parts and combinations thereof hereinafter described and claimed.

In order to make my said improvements more clearly understood, I have shown in the accompanying drawings, means for carrying them into practical effect, without however limiting the invention, in its useful applications, to the particular construction which, for the sake of illustration, I have delineated.

In said drawings,—Figure 1 is a longitudinal sectional view of an injector burner embodying my improvements. Fig. 2 is a plan view of the same. Fig. 3 is a transverse sec-

tional view on the line III—III of Fig. 1. Fig. 4 is a transverse sectional view on the line IV—IV of Fig. 2. Fig. 5 is a horizontal sectional view of the conical plug valve.

Referring to the drawings,—1 indicates the main body or casing of the injector burner formed preferably of cast metal. It has at its forward end a chamber 2 in which the final mixture of hot air with the already combined steam and oil takes place, and which is provided with a screw thread 3 adapted to be engaged by the threaded neck 4 of a main injector nozzle 5, through which latter the thoroughly mixed vapor, ready for combustion, is forced into the furnace. The nozzle 5 is provided at its forward end with a peripheral flange or projection 6 situated at a little distance back from the delivery end of the nozzle, whereby any liquid of condensation, which is sometimes formed when starting the burner cold, is prevented from running down upon the surface of the burner out of the furnace, and is compelled to be evaporated and consumed. The flange 6 is formed with an external screw thread 7 by which the burner may be screwed into the front wall or plate of the furnace, or other fixed part thereof.

In the top or other convenient part of the body 1 is formed a circular and tapering valve seat or bearing 8 with which communicates the oil duct 9, the outer portion of which latter is screw threaded and adapted to receive the oil pipe 10 running from any suitable tank or source of supply.

11 is a conical plug valve fitting in the seat 8 and having a stem 12 to which is attached a suitable handle 13 by which the valve may be operated. 14 is a longitudinal channel in the plug, with which communicates a V-shaped or wedge shaped opening 15 in the side of the plug adapted to be caused to register with the opening or duct 9 or to be cut off therefrom by turning the handle 13. In the former position oil is permitted to pass through the ducts 10, 9, 15 and 14, and to issue from the lower end of the plug. The V-shaped opening 15 co-operating with the round aperture 9 enables me to effect a very fine graduation of the flow of liquid and obtain the desired character of flame in which combustion is perfect. Whenever the flow of oil through this narrow opening is interrupted by clog-

ging with any solid or semi-liquid particle, a movement of the cock 11 dislodges the obstruction and permits it to pass through, whereupon the valve may be restored to its former position. I am thus enabled to maintain a practically continuous operation of the burner, without the annoyance and delay which are rendered necessary with the ordinary burner for clearing and relighting it.

16 is a screw-threaded neck formed with the body 1 and inclosing the outer portion of the seat or bearing 8. 17 is a cap having a central perforation for the stem 12 and screwed upon the neck 16 to keep the valve in place. To insure a close contact between the valve and its bearing, a spiral spring 18 is interposed between the cap and the top of the valve. This gives freedom of operation to the valve while at the same time a tight fit is insured.

19 is a partition or diaphragm formed with and extending across the body or casing 1 and provided with a perforation 20. The latter is controlled by a plug valve or spindle 21 having a screw threaded portion 22 which fits in a correspondingly threaded bushing 23. This bushing engages a screw threaded aperture 24 in the main body 1 of the burner. The outer end of the bushing 23 is provided with a stuffing box 25 of any suitable character, through which passes the stem 26 of the valve 21, carrying on its outer end an operating handle 27. By turning this handle the aperture 20 may be opened or closed in an obvious manner.

28 is a steam chamber formed in the casing 1 with which communicates a duct 29, in the outer portion of which is screwed the steam pipe 30 supplying steam from any suitable generator.

31 is a steam and oil mixing chamber formed contiguous to the diaphragm 19, and into which opens the aperture 20 and the delivery channel of the plug 11. In this chamber the oil delivered in a suitably graduated quantity from the plug and the steam entering in an annular jet through the orifice 20 and around the spindle 21 are thoroughly commingled before receiving their final expansion and vaporization by the addition of the heated air. The bottom of said chamber forms an arresting plate or support for the oil, which insures that it shall all be acted upon and taken up by the steam. The mingled steam and oil issues from the mixing chamber 31 through the opening 32, which is formed in line with the steam jet opening 20 and delivers into the outer or main mixing chamber 33. This latter is in direct communication with the jet nozzle 5.

The hot air is supplied to the device through a duct 34 formed in or with the casing 1, and with which is connected the hot air pipe 35. The heated air is supplied to the latter by any suitable appliance.

It will be observed that the plug cock controlling the flow of oil is so constructed and

held in place as to be capable of ready removal for any desired purpose with but slight interruption to the continuity of operation of the burner.

In clearing the oil supplying orifice of any obstruction the flame may be momentarily extinguished, but the operation of the plug valve is so instantaneous that the burner will ordinarily be reignited by the retained heat of the furnace or any part or wall thereof which may be opposite to the injector nozzle.

What I claim is—

1. In an injector burner the combination with the body or casing having the oil supply duct or opening, of a plug cock or valve having a longitudinal channel 14 and a V-shaped opening in its side communicating with such channel and adapted to register with the said oil duct, a suitable nozzle for the casing, and means for supplying steam and air thereto, substantially as set forth.

2. In an injector burner the combination with the casing 1 of the plug cock having a V-shaped aperture adapted to register with the oil supply duct of the casing and the longitudinal channel 14, a controlling spring adapted to press said cock into its seat, a nut controlling the spring, a jet nozzle, and means for supplying steam and heated air to the casing, substantially as set forth.

3. In an injector burner the casing 1 provided with the partition 19, the chamber 31 having a bottom formed contiguous to and in front of said partition and having the aperture 32, the chamber 2, and the lateral bearing 8 communicating with the upper side of said chamber 31, combined with means for regulating the passage of steam through said partition, an oil controlling valve mounted in said lateral bearing, a nozzle attached at the front end of said casing substantially in line with said aperture 32, and means for supplying air to the chamber 2, substantially as set forth.

4. In an injector burner the combination with means for producing a steam jet or stream, of a casing having an air chamber into which such jet is directed, means for supplying air to said chamber, a shelf or support beneath and in immediate proximity to the steam jet opening and formed with a cavity, and an oil supply over said shelf and outside of the jet passage or opening, substantially as set forth.

5. In an injector burner, the combination of the casing 1 provided at its forward end with a threaded aperture for the attachment of the nozzle, having the lateral seat or bearing 8 radial to the axis of the burner and an oil supply duct communicating therewith the plug or valve 11 in said bearing, the diaphragm or partition 19 provided with the steam supply aperture 20 and forming the steam chamber 28, the steam supply duct 29 communicating with the latter, and the bushing 23 screwed into the rear end of said body provided with a stuffing box, and internally

screw threaded to receive the steam controlling valve, substantially as set forth.

6. In an injector burner, the combination with the casing 1 having the oil supply duct 9, 5 of the conical bearing 8 formed in said casing radial to the axis of the burner and into which said duct opens, the plug valve 11 of conical form fitting in said bearing and provided with the longitudinal channel 14 and with the lateral V-shaped opening 15 adapted to register 10 with said oil duct, and means for supplying steam and heated air to the casing, substantially as set forth.

7. In an injector burner, the combination

with the casing, having means for supplying 15 the steam, air and oil, and having a main mixing chamber, of an arresting plate or support at the steam jet orifice, formed with a cavity and constituting a steam and oil mixing chamber within said main mixing cham- 20 ber, substantially as set forth.

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

WALTER BLAKE WRIGHT.

Witnesses:

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