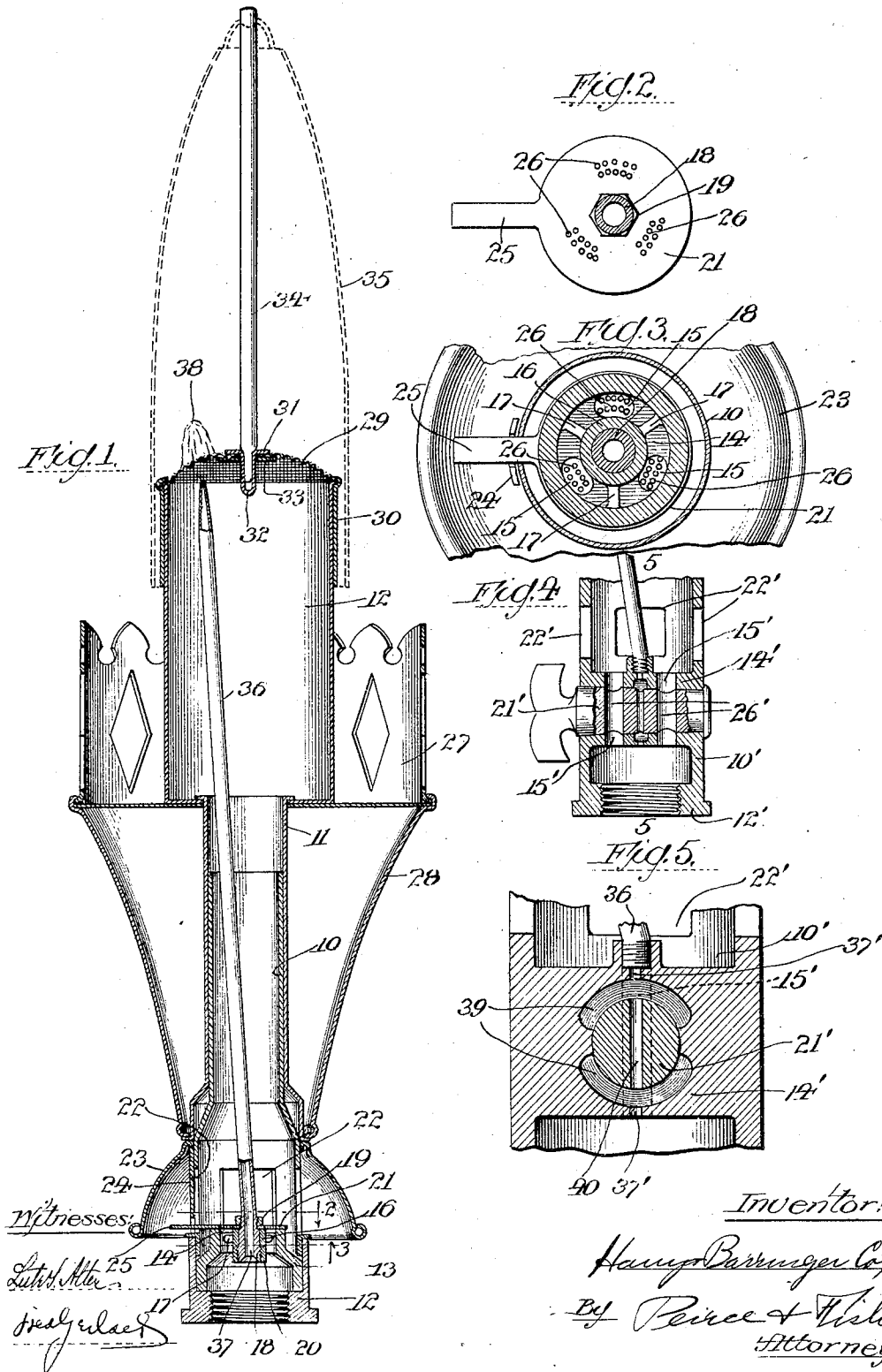


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PATENTED JUNE 6, 1905.

H. B. COX.  
INCANDESCENT BURNER.  
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# UNITED STATES PATENT OFFICE.

HARRY BARRINGER COX, OF CHICAGO, ILLINOIS, ASSIGNOR TO TRUMAN G. PALMER, OF CHICAGO, ILLINOIS.

## INCANDESCENT BURNER.

SPECIFICATION forming part of Letters Patent No. 791,883, dated June 6, 1905.

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*To all whom it may concern:*

Be it known that I, HARRY BARRINGER COX, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Incandescent Burners, of which the following is declared to be a full, clear, and exact description.

The invention relates to burners of the Bunsen type adapted to heat to incandescence a mantle of suitable material carried to the upper outlet of the burner.

More particularly, the invention relates to a by-pass or ignition device for such burners by which a small pilot-flame is maintained at the burner-outlet for conveniently lighting the burner.

The object of the improvement is to provide a simple and effective by-pass construction by which the pilot-flame may be maintained with a small consumption of gas and without blackening the mantle. Burners of this type comprise a mixing tube or chamber having air and gas inlets at its lower end, within which the air and gas are thoroughly mixed and burned at the upper outlet end of the tube to heat the incandescent mantle supported at that point. Usually, also, chimneys of glass or other transparent material are mounted about the upper end of the burner and about the incandescent mantle. In the ordinary method of lighting the gas is turned on and a match held over the upper end of the chimney, so that the burner is ignited with a sudden explosion, which is very apt to damage the fragile mantle. Attempts have heretofore been made to obviate this difficulty by providing a by-pass for gas opening into the lower end of the burner-tube; but in this construction the by-pass must be comparatively large to carry the mixture of air and gas to the upper end of the tube and maintain a pilot-light at that point. In other forms of construction a by-pass tube has been arranged to open above the mixture-outlets or gauze cap at the upper end of the burner-tube; but in this case the pilot-flame maintained is not a Bunsen flame, but is yellow and is liable to blacken the mantle by reason of the incom-

plete combustion. Moreover, this construction cannot be used with the usual type of gauze cap, but necessitates a special form of the same.

The present invention seeks to obviate the defects noted; and it consists in the features of construction, combinations, and arrangements of parts hereinafter set forth, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a vertical section of an incandescent burner to which the present improvement is applied. Figs. 2 and 3 are detail sections on lines 2 and 3, respectively, of Fig. 1, illustrating the valve for controlling the gas-inlet. Fig. 4 is a vertical section of a modified form of valve. Fig. 5 is a detail section on line 5 5 of Fig. 4.

The burner-tube may be of any suitable or desired construction and in the form shown comprises a lower section 10 and an upper section 11, fitted thereon. The lower burner-section 10 is provided at its lower end with a threaded thimble 12, by which the burner may be conveniently mounted upon a gas-jet. A plug 13, arranged within the thimble, is provided with a diaphragm or partition 14, having a series of main gas-inlet ports 15, as shown in Fig. 3. The plug 13 is also provided with a central hollow boss 16, supported on spider-arms 17. A plug 18, extending through the boss 16 and held in place thereon by nuts 19 and 20, carries a flat plate-valve 21, securely held in place against the partition 14.

Air-inlet ports 22 are arranged in the side wall of the burner-tube above the gas-inlet ports and the controlling-valve therefor. A conical shield 23, mounted upon the tube, extends over the air-inlets, as shown. Shield 23 is preferably rotatably mounted upon the burner-tube and is provided with a slotted lug 24, adapted to engage a laterally-extending arm 25 upon the valve and rotate it to bring the perforated portions 26 thereof into and out of register with the main gas-inlet ports 15, and thereby control the flow of gas to the burner.

The upper burner-section 11 is preferably

expanded at its upper end to form an enlarged mixing-chamber 12 and is provided with the usual chimney-gallery 27 and gallery-support 28.

5 The upper outlet end of the burner-tube is provided with a series of minute outlet-openings for the air and gas mixture, so that the flame will not "blow back" or ignite the gas within the burner-tube itself, but will only  
10 be maintained above the upper end of the tube. In the burner shown the minute mixture-outlets are formed in a gauze screen or cap 29 of the usual type. Since it is often desirable to renew the gauze screen when  
15 burned or broken, it is secured to a sleeve 30, removably fitted upon the upper end of the burner-tube. In the form shown and in the usual manner the gauze cap is provided with a central mount comprising a washer or plate  
20 31, having a depending section 32, extending through a central opening in the gauze screen. A lower plate or washer 33 is secured to the depending portion 32 of the upper washer, and these washers are arranged to firmly grip the  
25 gauze screen between them. A socket formed in the depending portion 32 of the upper plate is arranged to hold the vertical mantle-support 34, which carries the usual mantle 35 of suitable material.

30 The parts thus far described are of usual type and may be varied as desired without departure from the essentials of the invention.

In accordance with the present invention a by-pass is provided leading from the lower  
35 end of the burner-tube and terminating within the same adjacent and below the mixture-outlets or gauze screen at the upper end of the burner. Preferably the by-pass is in the form of a tube 36, mounted upon the plug 18 and communicating with the by-pass port 37, opening  
40 through the plug and extending past the main gas-inlet ports and the controlling-valve therefor. The by-pass or ignition tube 36 extends from the port 37 through the burner-tube and terminates at its upper outlet end adjacent and below the gauze cap 29. The upper  
45 end of the by-pass or ignition tube 36 is provided with a minute outlet, so that only a small amount of gas will pass therethrough. Preferably, also, the by-pass terminates directly below the openings in the gauze screen  
50 29 and is one side of the central mount through which carries the mantle-support. For this purpose the by-pass or ignition tube 36 is bent to one side or arranged at an incline, as shown.  
55

It will be observed that when the valve 21 is shifted to close the main gas-inlet ports it will not check the flow of gas through the by-pass. By reason of the location of the outlet  
60 end of the by-pass or ignition tube below the gauze screen the small amount of gas issuing therefrom will mix with air in the upper end of the burner-tube and the mixture will burn above the screen to form a small pilot-flame,  
65 as indicated at 38, and this pilot-flame, inas-

much as air is mixed with the gas before it is burned, will be a Bunsen flame—i. e., one of complete combustion—and will not therefore  
blacken the mantle. Moreover, by reason of the location of the upper end of the by-pass  
70 just below the gauze screen the outlet therein may be very small and permit the passage of only a small amount of gas. This small stream of gas will, however, be sufficient to carry the air and gas mixture across the short gap be-  
75 tween the outlet end of the by-pass and the gauze screen, so that the pilot-flame will burn above the gauze without "blowing back" or igniting the gas directly at the by-pass outlet. The by-pass flame may therefore be kept burn-  
80 ing at a very slight expense. In practice it has been found possible with the present invention to maintain a pilot-flame with the consumption of only one-tenth of a foot of gas  
85 per hour. When the valve is shifted to open the main gas-inlets, the pilot-flame will ignite the mixture of air and gas as soon as it passes beyond the gauze cap 29, so that there is no explosion of accumulated air and gas above the burner-tube, and consequently no shock or  
90 jar upon the mantle, as with the usual lighting methods employed. Moreover, the burner provided with the present by-pass construction does not require a special form of gauze  
95 cap; but the ordinary form having a central mount for the mantle-support may be employed, as indicated, and the gauze cap may be removed and renewed, as desired, without in any way interfering with the by-pass tube.

It is obvious that the details of the burner-  
100 tube, valve for controlling the main gas-inlet, and other parts may be widely varied by the skilled mechanic without departure from the essentials of the invention set forth in the claims. For example, other forms of valve  
105 may be employed, and one modified form is illustrated in Figs. 4 and 5. In this construction the burner-tube 10' is provided with a threaded shoulder 12' at its lower end adapted to engage a gas-jet. A cross partition or  
110 diaphragm 14', adjacent and above the lower end of the burner-tube, is provided with main gas-inlet ports 15'. A plug-valve 21', rotatably mounted in a suitable opening formed in the partition 14', is provided with ports or  
115 openings 26', adapted to register when the valve is in one position with the ports 15'. By slightly turning the valve the passage of gas through the main gas-inlets is cut off. Air-inlet ports 22' are provided in the side  
120 walls of the burner-tube 10 above the partition or diaphragm 14'. A by-pass extending through the diaphragm or partition 14' comprises the ports 37', which communicate with enlarged passages 39, extending partially  
125 about the plug-valve 21'. A port 40, extending through the plug-valve, normally connects the passages 39. The by-pass or ignition tube 36 extends from the upper port 37 to a point adjacent and below the gauze cap, as in the  
130

form previously described. With this construction plug-valve 21' may be shifted to open and close the main gas-inlet ports 15' without checking the flow of gas through the by-pass. If desired, however, the by-pass may also be cut off by shifting the valve through a quarter-turn.

It is obvious that the details of construction may be otherwise varied without departure from the essentials of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an incandescent burner, the combination with the burner mixing-tube having air and gas inlets at its lower end and a foraminous cover over the upper end of said tube, of a by-pass leading from the lower end of said tube and terminating within the mixing-chamber in said tube immediately below and closely adjacent the openings in said foraminous cover, whereby the gas from said by-pass will mix with the air in said burner-tube and burn with complete combustion above said foraminous cover, substantially as described.

2. In an incandescent burner, the combination of the burner-tube having air and gas inlets at its lower end, an expanded mixing-chamber at the upper end of said tube, a gauze cover at the upper outlet end of said mixing-chamber, a gas by-pass tube extending through said burner-tube and terminating within said mixing-chamber immediately below and so closely adjacent the openings of said gauze cover that the gas from said burner-tube will mix with the air in said mixing-chamber and burn with complete combustion above said gauze cover, and a valve arranged to open and close said gas-inlet without checking the flow of gas through said by-pass tube, substantially as described.

3. In an incandescent burner, the combination with a burner mixing-tube having air and

gas inlet ports at its lower end and a removable gauze cap at its upper outlet end, said cap having a central mount for the mantle-support, of a valve controlling the gas-inlet, a gas by-pass port and a tube extending from said by-pass port through said burner-tube and terminating below said gauze cap to one side of the central washer thereon, substantially as described.

4. In an incandescent burner, the combination of the burner mixing-tube, air and gas inlet ports at its lower end, a gauze cover at the upper outlet end of said tube having a central mount for the mantle-support and a gas by-pass leading from the lower end of said burner-tube and terminating within the tube, adjacent and below said gauze cover and to one side of said central mount, substantially as described.

5. In an incandescent burner, the combination with the burner mixing-tube having means at its lower end engaging a gas-jet, a partition above and adjacent the lower end of said tube, a main gas-port and a by-pass gas-port extending through said partition, a valve controlling said main gas-port, air-inlets in the side walls of said tube adjacent and above said partition, an expanded mixing-chamber at the upper end of said burner-tube, a gauze cover at the upper outlet end of said mixing-chamber and a by-pass tube extending from said by-pass port through said burner-tube and mixing-chamber and terminating immediately below and so closely adjacent the openings of said gauze cover that the gas from said burner-tube mixing with the air in said combustion-chamber will burn with complete combustion above said gauze cover, substantially as described.

HARRY BARRINGER COX.

Witnesses:

HARRY L. CLAPP,  
FRED GERLACH.