No. 646,840. Patented Apr. 3, 1900.

C. M. KEMP.

BUNSEN BURNER.

(No Model.) (Application filed Feb. 13, 1900.)

Fig. 1.

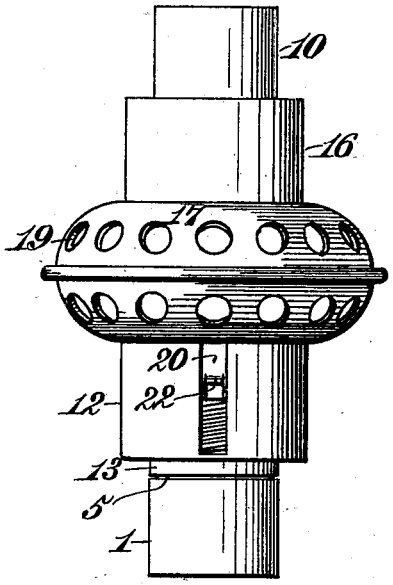


Fig. 2.

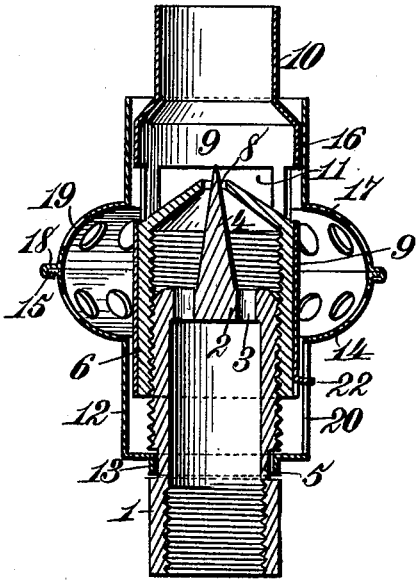


Fig. 3.

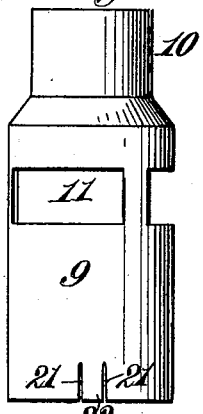


Fig. 4.

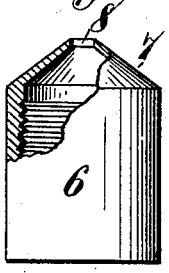


Fig. 5.

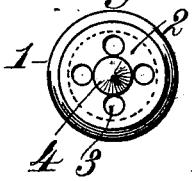
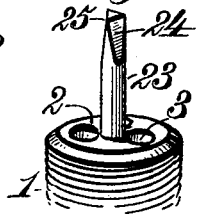


Fig. 6.



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UNITED STATES PATENT OFFICE.

CLARENCE M. KEMP, OF BALTIMORE, MARYLAND.

BUNSEN BURNER.

SPECIFICATION forming part of Letters Patent No. 646,840, dated April 3, 1900.

Application filed February 13, 1900. Serial No. 5,057. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE M. KEMP, a citizen of the United States, residing at Baltimore, State of Maryland, have invented certain new and useful Improvements in Bunsen Burners, of which the following is a specification.

This invention relates to Bunsen burners, and especially to that type of such burners wherein the flow of both the gas and air to the burner may be simultaneously regulated and accurately proportioned by a slight adjustment of a single part of the burner, whereby by a very slight manipulation of said part the flow of gas may be increased and the flow of air simultaneously diminished, or, vice versa, to accommodate the burner to the quality of the gas employed or the pressure at which it is furnished; and it has for its object to improve and simplify the construction of such burners whereby they may be made exceedingly light and at a very small cost and yet be strong and durable in construction and efficient and reliable in operation.

It has for its further object to so construct the adjusting mechanism that the flow of air to the burner will be rendered steady and uniform and the burner will not be affected by air-currents and drafts.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a view in side elevation of a Bunsen burner constructed in accordance with my invention. Fig. 2 is a vertical central sectional view of the same. Fig. 3 is a detail view of the burner-tube. Fig. 4 is a similar view, partly broken away, of the regulating-nozzle. Fig. 5 is a top plan view of the gas-supply tube, showing the conical valve and the perforations or gas-passages. Fig. 6 is a detail perspective view of a modified form of the valve.

Referring to the drawings, the numeral 1 indicates the gas-supply pipe, comprising a short section of metallic tubing, provided at its upper end with a partition or diaphragm 2, which is provided with a plurality of perforations 3, forming passages for the flow of gas therethrough, and provided centrally with an upwardly-projecting tapered or conical valve 4. Formed externally on the gas-supply tube and intermediate its ends is a circumferential groove 5, and between said groove and the upper end of the tube the latter is externally threaded, as shown.

Screwed over the threaded upper end of the gas-supply tube 1 is an internally-threaded sleeve or tube 6, terminating at its upper end in a conical nozzle 7, the apex of which is perforated, as at 8, into or through which the conical valve 4 projects in the manner and for the purpose hereinafter explained. Fitted on the sleeve 6 is the burner-tube 9, comprising a thin sheet-metal tube, which is preferably reduced in diameter at its upper end, as at 10, the tube 9 being of such diameter that when the sleeve 6 is forced within said tube it will fit tightly within the same in such manner that said sleeve and tube will be immovable relatively one to the other. In practice the sleeve is forced into the tube until their lower ends are flush or in alinement with each other. Punched or otherwise formed in the upper portion of the tube 9 is a plurality of apertures or ports 11, each preferably rectangular in shape and three in number, said ports forming inlets for the admission of atmospheric air to the burner-tube, the area of which ports may be increased or diminished at will in the manner hereinafter explained.

Disposed about the gas-supply tube 1 and the lower portion of the sleeve 6 and tube 9 is a collar 12, the lower end of which is reduced and provided with an annular flange 13, which is spun, pressed, or crimped into the circumferential groove 5 on the gas-supply tube, whereby while the collar is freely rotatable on the gas-supply tube it is prevented from having any endwise or vertical movement thereon either in an upward or downward direction. The upper end of the collar 12 terminates in a cup-shaped or approximately-semispherical enlargement 14, having formed at its upper edge a laterally outwardly projecting annular flange 15. Disposed over the upper end of the burner-tube 9 is a collar 16, the lower end of which terminates in an inverted-cup-shaped or approxi-

mately-semispherical enlargement 17, corresponding in size and shape to the enlargement 14 and having formed on its lower edge a flange 18, which when the enlargement 17 is seated on the enlargement 14 is bent, crimped, or swaged around and under the flange 15, thereby firmly and rigidly connecting the two enlargements together. The enlargements 14 and 17 together form an approximately-spherical hollow bulb, which is provided with numerous perforations 19 or otherwise rendered foraminous. Formed in one side of the collar 12 is a vertical slot 20, and formed in the lower end of the tube 9 are two vertical parallel slits 21, which extend entirely to the edge of said tube, thus forming a tongue 22. This tongue 22 is bent outwardly at substantially a right angle and projects through the slot 20, as most clearly shown in Figs. 1 and 2, whereby the tube 9 is caused to rotate with the collar 12 when the latter is turned about the gas-supply tube.

From the foregoing description the operation of my improved Bunsen burner will be readily understood. The gas flows from the gas-supply tube 1 through the passages 3 into the nozzle 7 and from the latter escapes through the aperture 8 around the conical valve 4 into the burner-tube 9. The air admitted to the foraminous bulb or air-chamber 14 17 flows through the ports 11 into the burner-tube and there mingles and is thoroughly mixed with the gas. To regulate and proportion the admission of the gas and air, it is only necessary to turn the bulb, and with it the collar 12, and thus through the medium of the tongue 22 turn the tube 9 and sleeve 6 on the gas-supply pipe 1. The sleeve 6 being screwed upon the gas-supply pipe 1, it follows that the nozzle 7 is raised or lowered. Hence when the bulb is turned in one direction the nozzle will be raised, increasing the area of the opening about the conical valve 4 and increasing the admission of gas to the burner-tube and simultaneously raising the burner-tube in the collar 16, thereby contracting or diminishing the area of the ports 11, and thus decreasing the admission of the air to the burner-tube. By turning the bulb in the opposite direction it will be evident that the described operation will be reversed, increasing the amount of air and diminishing the amount of gas admitted to the burner-tube.

The air before being admitted to the burner-tube must first pass into the foraminous bulb, whereby foreign matter is prevented from being drawn into the burner-tube. The bulb also acts as a guard or shield and operates to supply the air to the burner-tube in a steady and uniform manner, thus preventing the burner from being affected by drafts or air-currents.

It will be noted that all the parts of my improved burner excepting the gas-supply pipe, with its valve and the adjusted nozzle, are made of thin sheet metal, preferably sheet-brass, whereby the entire device may be very expeditiously manufactured at an exceedingly-small cost, said parts being stamped up and spun in a manner well known to those skilled in the art, and the device so made, while being strong and durable in construction and efficient and reliable in operation, will also be very light in weight, a desideratum of considerable importance when the burner is applied to some uses.

In practice the internal diameter of the collar 16 is made slightly less than the internal diameter of the collar 12, whereby the collar 16 fits snugly and neatly about the burner-tube, while the collar 12 does not contact therewith; but this is not essential.

In Fig. 6 of the drawings I have illustrated a modified form of valve. Referring to said figure, the numeral 1 indicates the gas-supply tube, 2 the partition or diaphragm on the upper end thereof, and 3 the perforations or gas-passages in the partition or diaphragm. Projecting centrally upward from the partition or diaphragm is a valve 23. Instead of the valve 23 being made tapering or conical, as before described, it is of a uniform diameter throughout; but the upper portion thereof is provided with a plurality of flat inclined faces 24, that converge toward each other at the top of said valve, thus forming vertical ribs 25. The ribs 25 are adapted to contact with the circular wall of the aperture 8 in the nozzle 7 and serve as guides to hold the valve centrally in said aperture and cause it to move accurately therein as the valve is adjusted. A plurality of segment-shaped apertures are thus formed between the flat faces of the valve and the circular wall of the aperture 8, through which the gas flows to the burner-tube, and it will be evident that as the nozzle is raised these spaces or apertures will increase in area, owing to the flat faces of the valve being inclined, as shown and described. If the nozzle be lowered sufficiently to cause the cylindrical portion of the valve to enter the aperture 8, the latter will be entirely closed and the gas prevented from flowing therethrough. Instead of making the faces of the valve flat, as shown, they may manifestly be made curved or concave.

The operation of the modified form of valve is the same as that before described.

Having described my invention, what I claim is—

1. In a Bunsen burner, the combination with a gas-supply tube and the valve thereon, of the regulating-nozzle threaded on the gas-supply tube and encircling said valve, a burner-tube fixed on said nozzle and provided with air-ports about the nozzle, a vertically-immovable collar disposed about the burner-tube, and means for rotating the nozzle and burner-tube to raise and lower the same and thereby regulate the admission of gas and air to the burner-tube, substantially as described.

2. In a Bunsen burner, the combination

with a gas-supply tube and the valve thereon, of the nozzle threaded on the supply-tube and provided at its apex with an aperture into which said valve projects, a burner-tube fixed on the nozzle and provided with air-ports about the nozzle, a vertically-immovable collar disposed about the burner-tube, a rotatable foraminous bulb surrounding said air-ports, and means operated by said bulb for rotating the nozzle and burner-tube and thereby adjusting the same vertically to regulate the admission of gas and air through the nozzle-aperture and air-ports, substantially as described.

3. In a Bunsen burner, the combination with a gas-supply tube and a tapered valve thereon, of the nozzle threaded on the gas-supply tube and provided at its apex with an aperture through which said valve projects, a burner-tube fixed on the nozzle and projecting above the latter, air-ports formed in said burner-tube, a foraminous bulb surrounding the air-ports and rotatably mounted on the gas-supply tube, means for preventing vertical movement of said bulb, a collar rigid with said bulb and encircling the burner-tube, and means actuated by the rotary movement of the bulb for raising and lowering the nozzle and burner-tube and thereby simultaneously varying the area of the nozzle-aperture and air-ports, substantially as described and for the purpose specified.

4. In a Bunsen burner, the combination with a gas-supply tube having a circumferential groove and the tapered valve on the upper end thereof, of the nozzle threaded on the gas-supply tube and provided with an aperture through which said valve projects, a burner-tube fixed on the nozzle and projecting above the latter, air-ports formed in said burner-tube, a vertically-immovable collar disposed about the burner-tube, a collar encircling the gas-supply tube and provided with a flange rotatably seated in the said circumferential groove, and means for rotatably connecting the burner-tube to but permitting it to move vertically independent of the rotatable collar, substantially as described.

5. In a Bunsen burner, the combination with a gas-supply tube having a circumferential groove, and a tapered valve on the upper end thereof, of the nozzle threaded on the gas-supply tube and provided with an aperture through which said valve projects, a burner-tube fixed on the nozzle and projecting above the latter, said burner-tube having air-ports formed in its upper portion, a vertically-immovable collar disposed about the upper portion of the burner-tube, and a collar disposed about the lower portion of the gas-supply tube and burner-tube and provided with a vertical slot, a projection on the burner-tube engaging said slot, said collar being provided with a flange rotatably seated in the said circumferential groove, substantially as described and for the purpose specified.

6. In a Bunsen burner, the combination with a gas-supply tube having a circumferential groove, and the conical valve on the upper end thereof, of the nozzle threaded on the gas-supply tube and provided with a central aperture through which said valve projects, a burner-tube fixed on the nozzle and projecting above the latter, said burner-tube having air-ports formed in its upper portion, two collars respectively arranged about the burner-tube and gas-supply tube, a foraminous bulb surrounding the air-ports and uniting the adjacent ends of said collars, the collar about the gas-supply tube being provided with a flange rotatably seated in the said circumferential groove and having a vertical slot, and a tongue struck up from the lower end of the burner-tube and projecting into said slot, substantially as described and for the purpose specified.

7. In a Bunsen burner, the combination with a gas-supply tube and a vertically-projecting valve on the upper end thereof, said valve being of a general shape of a cylinder and having a plurality of tapered faces on its upper portion, of the regulating-nozzle threaded on the gas-supply tube and encircling said valve, a burner-tube fixed on said nozzle and provided with air-ports about the nozzle, a vertically-immovable collar disposed about the burner-tube, and means for rotating the nozzle and burner-tube to raise and lower the same and thereby regulate the admission of gas and air to the burner-tube, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CLARENCE M. KEMP.

Witnesses:
JOHN S. COLE,
CHARLES I. PURNELL.