C. T. KINSMAN.

BUNSEN BURNER.

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1,386,630. Patented Aug. 9, 1921.

Fig. 2.

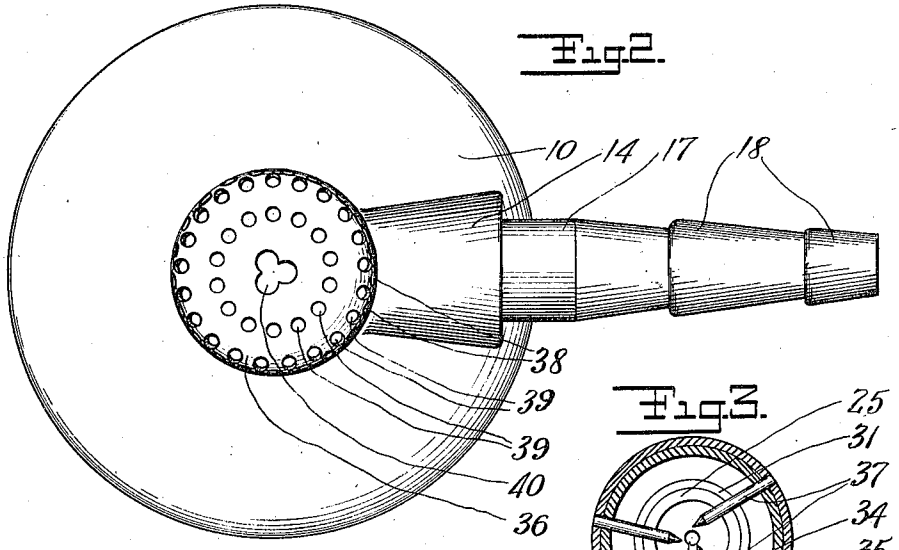


Fig. 3.

Fig. 1.

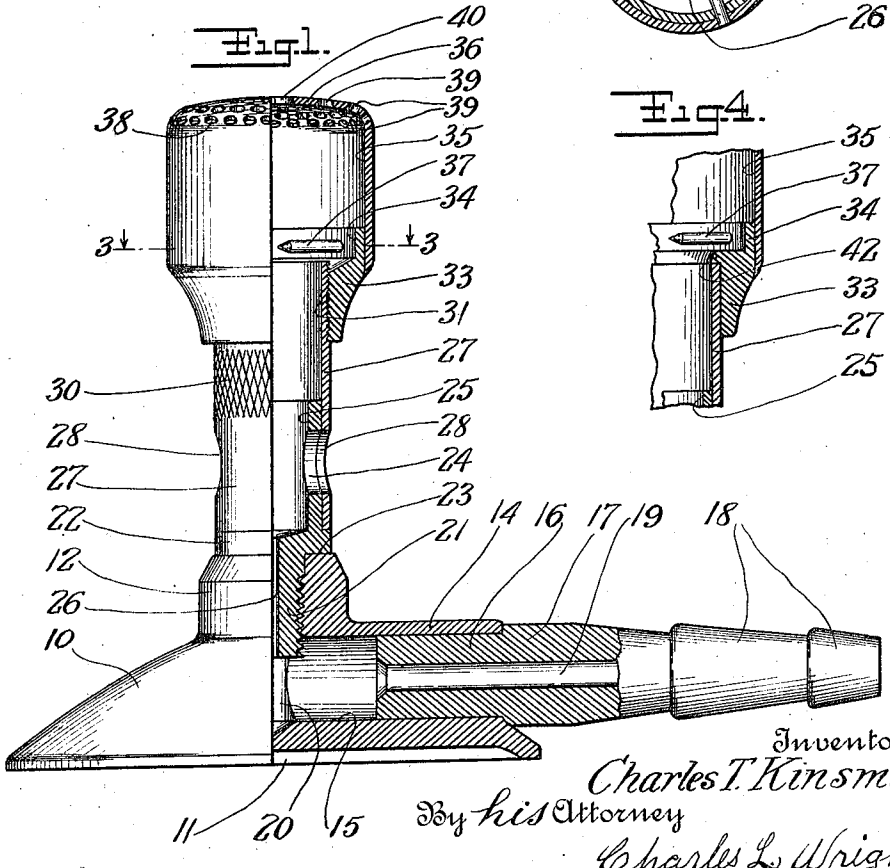


Fig. 4.

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UNITED STATES PATENT OFFICE.

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BUNSEN BURNER.

1,386,630. Specification of Letters Patent. Patented Aug. 9, 1921.

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To all whom it may concern:

Be it known that I, CHARLES T. KINSMAN, a citizen of the United States, and a resident of Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Bunsen Burners, of which the following is a specification.

The principal object of this invention is to provide a burner adapted to consume gas, such as is manufactured from coal and like substances and used as a fuel for illuminating and heating, natural gas, or the gaseous vapors of gasolene, etc., together with or without a percentage of air, and capable of producing an intense heat.

A further object is to provide a burner having a perforated cap adapted to cause the flames to flare and spread over a relatively large area, the cap being readily removable when a flame of smaller size is desired, or a cap of different type substituted, means being provided in the cap to thoroughly commingle the gaseous fuel and atmospheric air prior to its becoming ignited.

Another object is to provide a burner in which the tubular stem is easily separated from the base in order to permit cleansing the apparatus.

Other objects are to provide a burner of the Bunsen type, comprised of few and simple parts, designed to present a neat appearance, and which is unusually effective in its operation.

These object are attained by the novel construction, combination and arrangement of parts hereinafter described and shown in the accompanying drawings, forming a material part of this disclosure, and in which:—

Figure 1 is a partial side elevational and sectional view of a burner made in accordance with the invention,

Fig. 2 is a top plan view of the same.

Fig. 3 is a transverse sectional view, taken on line 3—3 of Fig. 1.

Fig. 4 is a fragmentary sectional view showing a modification in construction.

Referring to the drawings in detail, the numeral 10 designates the relatively heavy base of a burner, the same being preferably circular, having a recessed bottom 11, and a central raised standard 12.

A raised radial boss 14 is formed integral with the base, extending from a point near the edge to the standard, and contains a bored opening 15 into which is tightly fitted the reduced end 16 of an adapter plug 17, having on its extending portion a series of tandem cones 18, or like corrugations, adapted to engage the interior of the hose (not shown) by which gas is delivered to the burner, the gas passing freely through a central opening 19 in the adapter.

The standard 12 contains a bored opening 20, intersecting at its bottom with the opening 15, and screw-threaded at its upper end to receive the threaded lower end 21 of a hollow plug 22, the shoulder 23 of which rests upon the finished top of the standard 12.

Opposed openings 24 are formed through the upper reduced portion of the plug, which contains an axial bore 25 leading to the reduced orifice 26 in its lower portion, the same being approximately equal in area with the opening 19 in the adapter, thus providing a passage for the gas.

A tubular stem 27 is mounted to rotate upon the hollow plug 22, normally resting on the shouldered portion 23, and is provided with opposed transverse openings 28, which, by rotating the stem, may be brought into register with the openings 24, or so adjusted as to cover them completely, thus controlling the admission of air.

This construction also permits of instantly lifting the stem from the base affording easy access to the gas opening for cleaning, etc.

The stem is knurled or otherwise corrugated, as at 30, so as to be easily manually operated, and above the knurling is a screw threaded portion 31, the same being engaged normally in a corresponding opening formed centrally in the lower part of a bushing 33 having an enlarged upper portion 34 tightly fitted to an annular shell 35 provided with an integral convexly curved cap 36.

The bushing portion 34 is further held in place within the shell by a plurality of pins 37, three being preferred, these pins being arranged tangentially of the axis of the apparatus and extended well within the shell, acting to break up, mix and blend the gas and air as they pass upward to the cap, causing a gyratory effect and very materially assisting in producing an effective gas mixture, tending at the same time, to prevent "back firing" or igniting the gas

below and taking the place of metallic gauze usually employed for that purpose.

An annular row of perforations 38, having an area determined by experiment, are formed through the cap 36, near its outer edge, the same being disposed at approximately forty five degrees from the central axis, thus distributing the flame outwardly over a considerable area.

One or more inner rows of like perforations 39 are arranged interjacently and a central opening 40, preferably presenting three lobes as indicated, complete the exits for the gas, ignition taking place exteriorly of the cap.

The increased flow of gas through the center opening, due to its larger area, causes the flame to concentrate at the top, the maximum heat of the entire flame being brought to a focus at this central point, producing a concentrated flame, the tip of which is used to heat small surfaces, while the broad body of the flame may be used in heating larger surfaces.

The thin sheet metal cap 36 and shell or casing 35 act to convey a portion of the heat of the flames to the mixed gas and air within the mixing chamber formed by them, preheating the gas while it is mixing, thereby hastening combustion.

In the modification shown in Fig. 4, in place of the stem 27 being threaded at its upper end, it extends into the bushing 33 which is formed with an interior annular flange 42 resting on the end of the stem as shown.

In either form of burner the entire head, including cap, pins and bushing, make a tight joint with the tube, preventing "back firing," but can be quickly and easily removed from the end of the tubular stem which then may be used as an ordinary Bunsen burner.

In operation the gas tube having been engaged on the adapter 17, the stem is turned on the plug to admit the proper amount of air and the burner ignited in the usual manner, the flames being controlled by the quantity of gas and percentage of air, which obviously may be controlled by rotating the stem to produce the desired results.

Should the burner become clogged by spilling material in it, it can be cleaned by removing the stem from base or cap from stem in an effective manner.

I claim:

1. In a burner of the type described, the combination with a burner tube, of a mixing chamber having a convex top containing a plurality of perforations adapted to act as outlets, means for detachably engaging said chamber to said tube, said chamber having a sectional area of greater magnitude than the tube, and a plurality of tangentially disposed pins fixed in said chamber adapted to intercept a passing stream of gases to deflect and intimately commingle the same.

2. In a burner of the type described, the combination with a burner tube, of a mixing chamber having a convex top containing a plurality of perforations adapted to act as outlets, means for detachably engaging said chamber to said tube, and projections extending tangentially inward from the side wall of said chamber against which a passing stream of gases impinge, said projections being positioned adjacent the extremity of said tube.

3. In a burner of the type described, the combination with a base and a burner tube removably engaged therewith, of an expanded mixing chamber, means for removably engaging said chamber to said tube, said chamber having relatively thin side walls and a perforate convex cap, and pins extending tangentially into the chamber adjacent the end of said tube.

4. In a burner of the type described, the combination with a base and a burner tube removably engaged therewith, of a bushing engaging said tube at its upper end, a hollow casing secured to said bushing, an outwardly curved cap formed with said casing, said cap having a plurality of perforations passing radially therethrough, and pins arranged at spaced intervals set in said casing to extend over the open end of said tube.

5. A burner of the type described, comprising in combination with a base having an inlet, a vertical hollow plug removably engaged in said base and a tubular stem circumjacently mounted on said stem, said stem and plug having opposed registerable openings, of a mixing chamber engageable with the upper end of said stem, and a convexly curved cap on said chamber, said cap containing perforations adapted to cause the issuing flames to radiate in all directions.

6. A burner of the type described, comprising in combination with a base having a lateral inlet, a hollow plug erect at the center of the base, said plug having a shouldered portion, and a tubular stem resting on said portion revoluble on the stem, said stem and plug having registerable lateral openings, of an expanded mixing chamber removably engaged with the upper end of said stem, said chamber having a perforate cover, and means carried within said chamber adapted to intercept and blend streams of passing gases prior to ignition.

7. In a burner of the type described, a mixing chamber comprised of a cylindrical element formed with a convex cover and having a row of perforations directed angularly outward through its walls at the junction of the cover and cylinder, another interjacent row of perforations in said cover, together with a trilobed opening at its cen-

ter, and a fuel inlet tube upon which said chamber is normally seated.

8. In a burner of the type described, a chamber having circular walls and a domed cover, a base having a contracted opening in said chamber, a fuel inlet tube on which said base rests, and means formed in said cover adapted to produce a central concentrated flame surrounded by a plurality of flames of lesser magnitude.

In testimony whereof I have signed my name to this specification.

CHARLES T. KINSMAN.