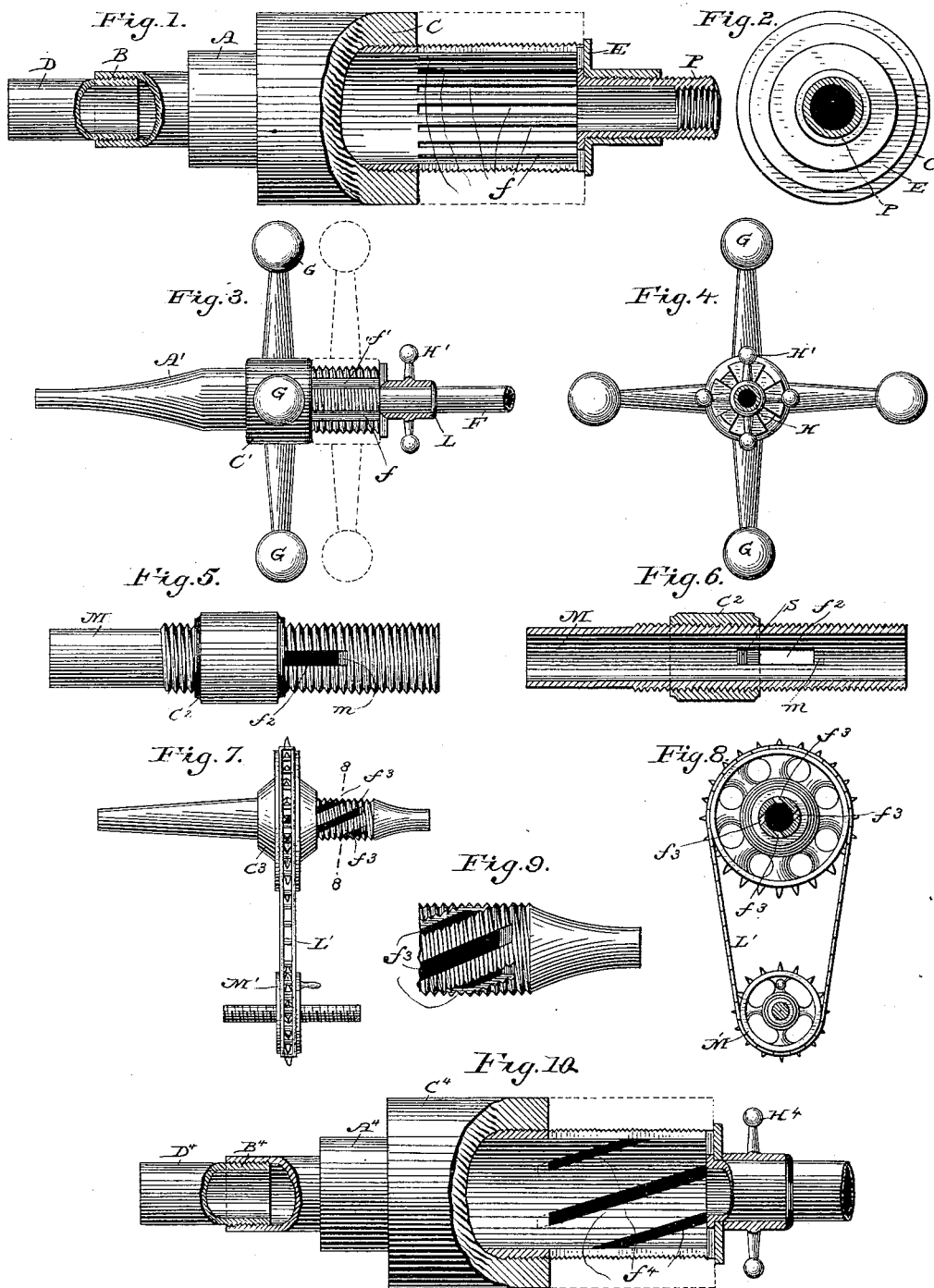


(No Model.)

C. A. O. ROSELL.  
GAS OR VAPOR BURNER.

No. 348,346.

Patented Aug. 31, 1886.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## GAS OR VAPOR BURNER.

SPECIFICATION forming part of Letters Patent No. 348,346, dated August 31, 1886.

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*To all whom it may concern:*

Be it known that I, CLAUDE A. O. ROSELL, a citizen of the United States, residing at Natrona, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gas or Vapor Burners; and I do hereby 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 invention relates to certain new and useful improvements in gas or vapor burners of the type generally called "air-burners," wherein atmospheric air is entrained into the gas or vapor current during the passage of the latter to the burner-tube, for the purpose of securing such an intimate admixture of the two as shall, on ignition, produce a flame of any desired character. Prior to my present invention the device in general use for this purpose has been the well-known Bunsen burner, wherein the burner-tube is provided at its lower portion with a series of openings of circular contour, capable of being opened or closed by means of a sleeve correspondingly perforated and revoluble without longitudinal movement upon the burner-tube, or by means of an imperforate sleeve which can be put on or removed as occasion requires, or by means of an imperforate sleeve capable of being raised or lowered by means of an internal screw-thread moving upon a corresponding screw-thread of the burner-tube. In practical use, and especially in laboratory work, this burner and others heretofore constructed having rectangular air-inlet openings opened and closed by means of a correspondingly-perforated sleeve revoluble without longitudinal movement upon the burner-tube present disadvantages, hereinafter more particularly referred to, which decrease their efficiency and render their employment, even in the hands of those long accustomed to their use, to a large extent unsatisfactory. Principal among these difficulties is the absence of means for guarding against uncertain and irregular movements of the sleeve while it is being adjusted to suit the particular requirements of the work in hand.

From the absence of adequate and sufficiently delicate, regular, and uniformly variable means

of adjustment the operator oftentimes fails to secure a good flame or the exact character of flame desired, and frequently during his manipulations the flame is entirely extinguished. This difficulty arises from the configuration of the openings in the burner-tube and the means by which they are closed, inasmuch as the diminution or increase in area of the openings for an initial distance of rotation of the shell is not equally proportionate to their diminution or increase in continuing said rotation for a like distance, the distance of rotation of the shell furnishing no accurate guide to the change of area of the openings. If, as sometimes is the case with laboratory-burners, the adjustment is effected by means of a shell rotating in a fixed plane and operated by means of a lever, the burner will have the following inconveniences: The variations in the area admitting air are too sudden and abrupt. It is difficult, without additional complicated appliances, to make the lever keep its position. The lever will be in the way, or will occupy room needed for other purposes, and is apt to become accidentally touched or pushed, whereby the supply of air is either suddenly and entirely cut off or admitted in such quantity as to superaerate and extinguish the flame. If the admission of air into the burner is by means of valves, as is sometimes the case, the disadvantages of the burner in such shape are, that it becomes too complicated, bulky, or unsymmetrical, difficult of construction, unhandy, inconvenient, and confined within narrow limits in regard to the variations of the quantity of air-supply.

It is the object of my invention to obviate the defects above noted by the production of a burner wherein the area of rectangular air-inlet openings may be regulated with accuracy by means of a shell capable of a graduated uniform movement, and for equal distances of travel increasing or diminishing said area, being also neutral, so that the regulation and the permanent setting are accomplished simultaneously, thereby producing a flame of any desired character under the most varied conditions of pressure and chemical composition of the gas or vapor burned.

My invention furthermore provides means for securing in some instances a more intimate mixture of air with the combustible gas or

vapor, and facilitates its entrance into the burner-tube, and furnishes means for operating the sleeve when the latter or the surrounding atmosphere has become too highly heated by conduction or radiation.

The construction constituting my invention is illustrated in the accompanying drawings, wherein Figure 1 is a side elevation, partly broken away and partly in section, of one form of my invention. Fig. 2 is an end elevation thereof. Fig. 3 is a side elevation, and Fig. 4 an end elevation, of a modification thereof. Fig. 5 is a side elevation, and Fig. 6 a section, of a further modification. Fig. 7 is a side elevation, and Fig. 8 a section on the line 8-8, Fig. 7, of still another modification. Fig. 9 is an enlarged detail view of a portion of the same. Fig. 10 is a side elevation, partly broken away and partly in section, of a further modification of my invention.

Similar letters of reference indicate similar parts throughout the several views.

Referring more particularly to Figs. 1 and 2, P indicates the gas or vapor supply pipe. This pipe enters the mixing-chamber A through an end perforation in said chamber, and is attached thereto by soldering or otherwise. The chamber A is of larger diameter than the pipe P, and is provided with a series of slots, *f f*, of any number, at any desired intervals, extending through the shell of the chamber along its body and radially across the end proximate to the pipe P. The chamber A is externally screw-threaded for a part of its length, including the slotted portion, as shown. Upon this screw-thread travels the internally-screw-threaded sleeve C, imperforate throughout, the pitch of the screw-thread being chosen so as to give the desired longitudinal movement of the sleeve for a complete revolution thereof.

From the outer end of the mixing-chamber issues the burner-tube B, provided with the adjustable section D, whereby the length of said tube may be varied at will. The slots *f f* are of uniform rectangular configuration along the body of the chamber A, whereby during the movement of the sleeve C the inclosed area of the slots is uniformly increased or diminished, as the case may be, for equal distances traveled by said sleeve. The radial openings in the end of the chamber A are adapted to be closed by the screw-threaded flanged sleeve E, traveling upon the externally-screw-threaded gas-pipe P. When desired, it is evident that either the end slots may be closed and the body-slots left open, or vice versa, or both sets of slots left open, according to the particular character of flame to be produced, and the velocity, volume, and quality of the combustible gas-current employed. The device may also be used as an ordinary burner by completely closing all the slots. The exterior configuration of the sleeve C is immaterial, and may be other than circular, as represented in the drawings. I prefer in some instances to provide the sleeve with a

rim or cover of non-conducting material, so that it may be manipulated without inconvenience.

In the modification of my invention shown in Figs. 3 and 4, instead of providing a separate burner-tube leading from the chamber A', I form said burner-tube integral therewith, but with the gradually-tapering shape illustrated. The sleeve C' moves over the slotted chamber in like manner as the sleeve C, and is provided with spokes G G, supporting a rim, which may be loaded so as to revolve the sleeve more than one revolution by a single impetus given to the wheel when it is desirable to close or shut the slots suddenly; or the spokes themselves may be used to turn the sleeve, which is the method shown in Figs. 3 and 4. By means of these spokes the number of revolutions given to the shell can be accurately determined. The slots *f'* in the chamber A' are of like character to those shown in Figs. 1 and 2. The end slots are, however, regulated in area by means of the rotary sleeve-damper H, supplied, if desired, with spokes H' or a wheel for turning it, and having axial movement only, being held in place against longitudinal movement by means of a back-stop flange, L, upon the gas-pipe P'.

It may be said, generally, with regard to the end slots shown in the two forms of my invention already described, that if the pressure of gas or vapor is so great that at no time the quantity of air required for oxidation is less than that admitted through said end slots, the sleeves E and H may be entirely dispensed with; or they may be constantly adjusted in such position as to fully uncover the end slots. On the other hand, if the pressure of gas or vapor be such that at no time the quantity of air required for oxidation is greater than the longitudinal slots will supply when entirely uncovered by the shell C, the end slots may be entirely omitted, as in the two additional forms of my invention illustrated in the remaining figures. In such case the end sleeve is necessarily omitted.

The preferred manner of cutting the longitudinal slots is illustrated in Figs. 5 and 6, and consists in giving a forward bevel or slant to the ends thereof, which are always parallel, by cutting away the metal at *s* on the inner side and at *m* on the outer side of the tube at an acute angle, thereby facilitating the entrance of the air-current. In this form of my invention it will be noted that there is no separate and distinct mixing-chamber, or, rather, that the gas or vapor supply pipe, mixing-chamber, and burner-tube are made from the pipe M of uniform diameter. This form, although not as satisfactory for all purposes as the others, will nevertheless, for some uses, give sufficiently good results. In this construction the chamber A may also form a long sleeve having internally-screw-threaded ends to connect the ends of the pipes P and B, Fig. 1, in the manner in which the ends of pipes are usually connected, the chamber A in that

case of necessity of a little larger diameter than the pipes it connects, and this difference in size is sufficient to make a very effective and at the same time very simple burner.

5 It will be observed in Figs. 5 and 6 that the screw-thread upon which the sleeve C<sup>2</sup> moves is continued to the right, thereby permitting the sleeve to be moved also from the flame in increasing the uncovered area of the slots f<sup>2</sup>.

10 In Figs. 7, 8, and 9 the sleeve C<sup>3</sup> is provided with a sprocket-wheel operated by a suitable sprocket-chain passing over the wheel M'. This device is employed where by reason of the high heat enveloping the sleeve C<sup>3</sup>, or by  
15 the position of the latter, it is impracticable to operate said sleeve directly by hand.

The wheel M' may be operated by a suitable rim-spoke, and, if desired, may travel upon a screw-threaded shaft, whose pitch is so chosen  
20 as to insure a movement of the said wheel corresponding to the movement of the sleeve, or where the path of movement of the sleeve is small the wheel M' may be stationary, the sprocket-chain permitting the sleeve to move  
25 within such path. The slots f<sup>3</sup> are in this instance, as shown, cut spirally or obliquely in the body of the mixing-chamber, thereby for the same length of pipe giving a longer slot, and also giving a rotary motion to the enter-  
30 ing air, and insuring a better admixture with the gas or vapor. The slots f<sup>3</sup>, moreover, are beveled off at the sides and ends, as illustrated more clearly in Figs. 8 and 9, for the same  
35 purpose as the beveling shown in Figs. 5 and 6. It is evident that these oblique or spiral slots may be used in place of the straight longitudinal slots of the other forms of my device and in conjunction with the end slots. Thus in  
40 Fig. 10 I have represented a construction wherein the mixing-chamber is provided with spiral or oblique air-inlet openings f<sup>4</sup>, extending along the body thereof, and air-inlet open-  
45 ings in the end of said mixing-chamber proximate to the gas-supply pipe P', an imperforate sleeve, C', being provided for the former open-  
50 ings, and a rotary cut-off, H', for the latter openings.

It will be noted that in each of my modifications the slots, whether straight or curved,  
50 have parallel sides and ends, thereby permitting and insuring equal variations in the area of the air-inlets with equal revolutions of the regulating-sleeves.

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

1. A gas or vapor burner provided with oblique air-inlet openings having parallel sides and ends, substantially as described.

60 2. In a gas or vapor burner, the screw-threaded tubular chamber having in its perimeter air-inlet openings with parallel sides and ends, in combination with a screw-threaded sleeve for regulating the area of said open-  
55 ings, substantially as described.

3. A gas or vapor burner provided with oblique air-inlet openings having parallel

sides and ends and a screw-threaded sleeve for regulating the area of said openings, substantially as described.

70 4. A gas or vapor burner consisting of a gas-supply pipe, a mixing-chamber of larger diameter than said pipe and provided with air-inlet openings in the end thereof proximate to the gas-supply pipe and air-inlet  
75 openings extending along the body thereof from said end to a point about midway of the length of said mixing-chamber, and a burner-tube, substantially as described.

5. A gas or vapor burner consisting of a  
80 gas-supply pipe, a mixing-chamber of larger diameter than said pipe and provided with air-inlet openings extending along the body thereof and air-inlet openings in the end thereof proximate to the gas-supply pipe,  
85 and a screw-threaded sleeve regulating the former, and a burner-tube, substantially as described.

6. A gas or vapor burner consisting of a  
90 gas-supply pipe, a mixing-chamber of larger diameter than said pipe and provided with air-inlet openings extending along the body thereof and air-inlet openings in the end thereof proximate to the gas-supply pipe, a  
95 screw-threaded sleeve regulating the former, and a cut-off for the latter openings, and a burner-tube, substantially as described.

7. A gas or vapor burner consisting of a  
100 gas-supply pipe, a mixing-chamber of larger diameter than said pipe and provided with oblique air-inlet openings extending along the body thereof and air-inlet openings in the end thereof proximate to the gas-supply pipe, and  
105 a burner-tube, substantially as described.

8. A gas or vapor burner consisting of a  
110 gas-supply pipe, a mixing-chamber of larger diameter than said pipe and provided with oblique air-inlet openings extending along the body thereof and air-inlet openings in the end thereof proximate to the gas-supply pipe, a  
115 screw-threaded sleeve for regulating the former openings, and a burner-tube, substantially as described.

9. A gas or vapor burner consisting of a  
120 gas-supply pipe, a mixing-chamber of larger diameter than said pipe and provided with oblique air-inlet openings extending along the body thereof and air-inlet openings in the end thereof proximate to the gas-supply pipe, a  
125 screw-threaded sleeve for regulating the former openings, and a cut-off for the latter, and  
130 a burner-tube, substantially as described.

10. A gas or vapor burner consisting of a  
135 gas-supply pipe, a mixing-chamber of larger diameter than said pipe and provided with air-inlet openings extending along the body thereof and air-inlet openings in the end thereof proximate to the gas-supply pipe, a  
140 screw-threaded sleeve regulating the former, and a rotary cut-off for the latter, and a burner-tube, substantially as described.

11. A gas or vapor burner consisting of a gas-supply pipe, a mixing-chamber of larger diameter than said pipe and provided with

oblique air - inlet openings extending along the body thereof and air-inlet openings in the end thereof proximate to the gas-supply pipe, a screw-threaded sleeve regulating the former, and a rotary cut-off for the latter, and a burner-tube, substantially as described.

12. A gas or vapor burner provided with oblique air - inlet openings having beveled sides and ends, substantially as described.

10 13. A gas or vapor burner provided with an

air-regulating sleeve having a sprocket-tooth periphery, in combination with a drive-chain and auxiliary wheel for operating the same, substantially as described.

In testimony whereof I affix my signature in 15 presence of two witnesses.

CLAUDE A. O. ROSELL.

Witnesses:

JOHN C. PENNIE,  
EDGAR T. GADDIS.