

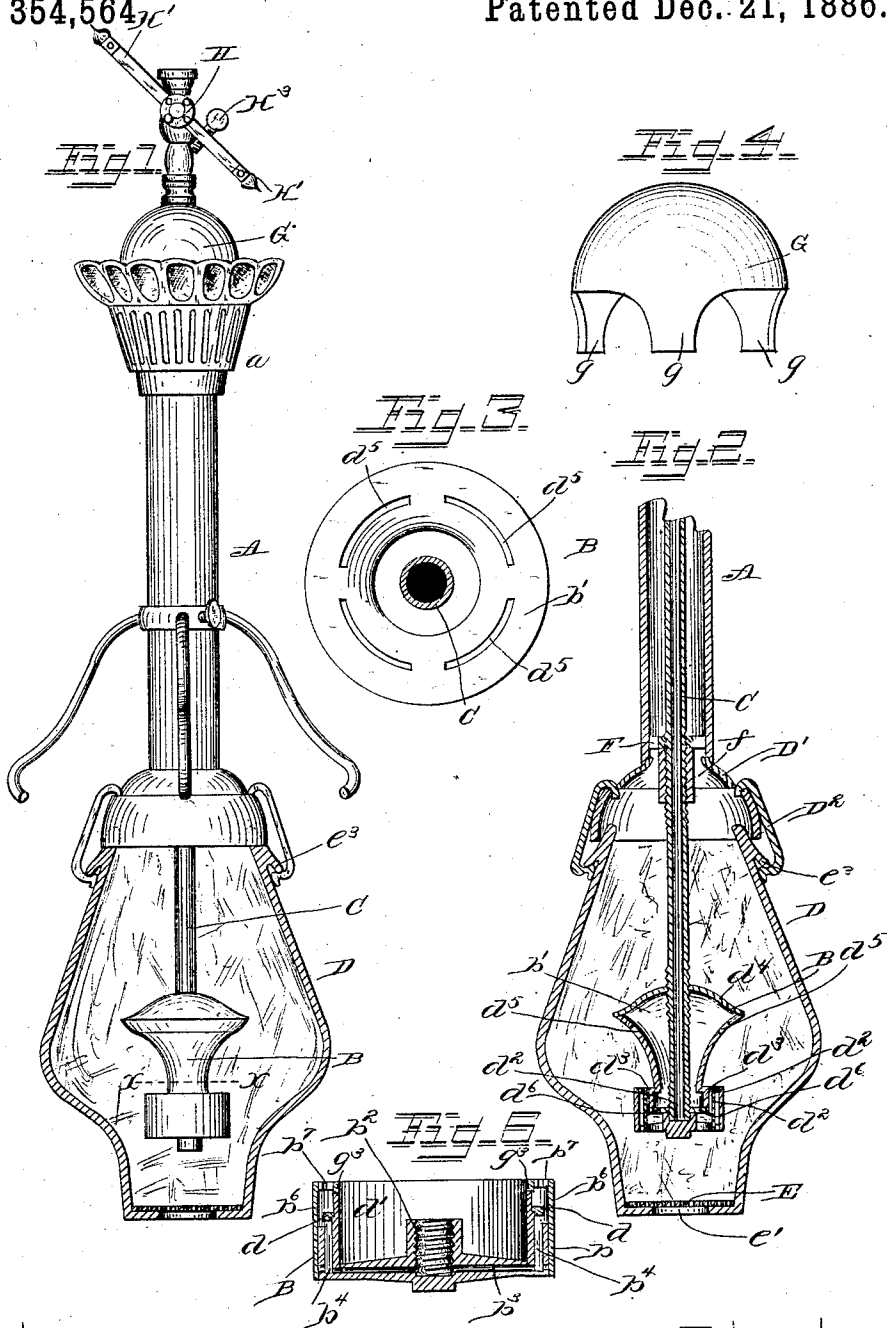
(Model.)

W. S. MEAD.

REGENERATIVE GAS BURNER.

No. 354,564

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REGENERATIVE GAS-BURNER.

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To all whom it may concern:

Be it known that I, WILLIAM S. MEAD, a citizen of the United States of America, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements Regenerative Gas-Burners, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention has relation to improvements in Argand and other gas-burners, the same having mainly for its object to fully develop the flame and produce a clear, steady, and brilliant light; and the invention, therefore, consists of contrivances for abating or modifying
15 the draft for heating the air or oxygen which aids combustion, and for enhancing, diffusing, and deflecting the flame, and expanding the gas by heat, all substantially as hereinafter
20 more fully set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a partly sectional and partly a side elevation of an electric gas lamp or chandelier embodying
25 my improvements. Fig. 2 is a sectional elevation of the same with parts broken away. Fig. 3 is an enlarged horizontal inverted sectional view taken on the line *x x*, Fig. 1, showing the air or oxygen passage in the under side of the dome. Fig. 4 is a detached
30 side view of the dome or cap of the chimney or stack, and Fig. 5 is an enlarged sectional view of the base of the burner.

In the embodiment of my invention I employ, as usual, the stack or chimney A for inclosing the gas-pipe and for heating the gas, and said stack or chimney has for ornamentation the appearance of a column, including its capital *a*.

40 B is the burner, which is screwed to and suspended by means of a gas-supply pipe, C, in practice connected to the service-pipe and passing down through the stack or chimney A, the same extending considerably below the
45 latter. The burner consists of two principal parts, one being the body of the burner *b* and the other being the oxygen or hot-air supply chamber *b'*. The upper edge of the inner wall of the inner part of the burner extends up beyond the outer edge of the burner, and the
50 spreader projects nearly over the gas-flue, in order to spread and enlarge the volume of the

gas as it flows through the apertures, as shown, thus rendering the volume of the gas uniform.

The burner B is provided for its connection 55 to the gas-pipe C with a central internally-screw-threaded nozzle, *b²*. From this nozzle a series of radial gas-passages, *b³*, extending through the arms of the spider or spoke-like bottom of the base or combustion-chamber, extend or lead to a narrow deep annular chamber, *b⁴*. Around said outer wall of the burner B is fitted gas-tight a cylindric casing, *b⁵*, which extends upward a short distance. The inner
60 depending edge, *g³*, rests upon the upper edge of the inner wall, *b*, of the burner B.

d is an annulus or deflector fitted upon an offset or shoulder of the inner wall, *b*, of the burner B, and arranged within the enlargement of the chamber *b⁴*, formed by the casing *b⁵*, and slightly above the upper edge of the
70 outer wall of the burner, providing a narrow passage-way between said upper edge of the outer wall and itself, and a still narrower passage-way between the casing *b⁵* and itself, whereby the gas leaving the chamber *b⁴* will be deflected into the upper compartment of the enlargement of the said chamber *b⁴* into a thin film
75 or sheet, whence it escapes in like manner through the apertures in the upper flanged edge of the casing *b⁵* for ignition. Thus the ignited
80 gas issuing from the top edge of the casing *b⁵* will be converted into a fully-developed bowl or wall-like shaped flame of great brilliancy, which latter is due, however, in a measure, to the
85 hereinafter described construction of parts.

The hot-air or oxygen chamber *b'* of the burner is provided with a cylindric lower end, *d²*, screwed upon the gas-pipe C within a central compartment, *d¹*, of the burner B, and
90 down upon the upper edge of the nozzle *b²*, the same thus providing a narrow passage-way, *d³*, between itself and the inner wall of the burner for the passage or admission of air or oxygen from below between the lugged
95 openings, as also the hot air, as hereinafter described, from the hot-air chamber *b'* to feed the flame.

In the bottom or lower edges of the cylindric lower end, *d²*, of the hot-air chamber *b'* 100 is provided the series of passages, slots, or apertures *d⁴*, for the passage from said chamber of hot air to the flame of the burner, the air from said passages or slots passing into the passage

d^3 , and from thence, together with the previously-referred to air, which has now also become heated, to the flame. The hot air or oxygen chamber b' is flared from a contraction of itself immediately adjoining said lower cylindric end, d^2 , upwardly, which flared portion is covered at its upper edge by a dome, d^4 , to deflect the hot air, which dome is screwed upon the gas-pipe C.

10 In the sides of the hot air or oxygen chamber b' , up near its maximum flare or dome, is a series of segmental slots or apertures, d^5 , arranged at short intervals apart around the said chamber for the admission of air to said chamber. The entire periphery of the hot-air or oxygen chamber is silvered, nickel-plated, or enameled, and is thus constructed in order the better to reflect the light, and thus to enhance its brilliancy.

20 The upwardly-flared surface of the burner has the effect to deflect and spread and thus enlarge the flame, while, although upon first lighting the gas, owing to the entrance of the air at the bottom, the flame will jump or greatly flicker and have a bluish cast. All this will soon be displaced by a fine steady mellow and bright light when the air-currents are reversed, as hereinafter described, and with an unsurpassed illuminating power or capacity.

30 It will be here remarked that it has been found by actual experiment that while the air, upon first lighting the lamp, will enter the air-chamber b' through the air passages or slots d^6 in its lower edges or bottom and feed the air through its upper slots or passages, d^7 , to the flame, climbing up around the outside of said chamber, the air in said chamber will, however, upon the burner becoming thoroughly heated, reverse its action, and a hot-air current will thus be produced, passing down and out through the lower slots or passages, d^6 , of said chamber, and a portion thereof will feed the upper part of the flame with hot air or oxygen, and the remaining portion again enters through the slots or apertures d^5 .

45 When the air and burner become heated, the inflowing current of air is reversed and enters through the slots or apertures of the hot-air or oxygen chamber and flows through the recesses of the bottom, thus producing circulation of oxygenated air, as before stated.

50 D is the chimney, which may be of the form shown, or other suitable shape, and which is suspended below an approximately bell-shaped cap, D' , secured to the lower end of the chimney or stack A. The bell-shaped cap D' , being constructed to limit the draft, and hence the supply of air, by closing, by means of the radial arms or spokes disposed in the upper part of the bell, has a tendency to mellow the flame, and to prevent the bluish color of flame which would otherwise be produced, and in this connection the dome disposed on the top of the capital a also retards the flow of the air, and thus serves as an adjunct in preventing its too great supply.

It will be observed that sufficient air passes

up through the lower part of the burner and becomes heated, and finds its outlet near the apex of the flame, to cause the upper part of the flame to become as brilliant as its central part. The suspension of the globe is effected by means of the hooks D^2 , whose upper ends may be swaged or riveted upon a step or shoulder of the cap D' , the lower ends of said hooks catching in sockets e , formed in the outer upper surface of the chimney. The chimney D is also, unlike other such devices hitherto constructed, tapered inwardly in diameter toward the burner, near its lower part, as shown, and projects down beneath the same, thus admitting the light to project down and beneath the burner, and preventing the shadow which is ordinarily thrown from beneath the lamp, the globe being turned inwardly at bottom to form a flange as a bearing for the perforated metallic or glass plate. In the lower end or bottom of the globe D is a circular air opening or passage, e' , and upon said bottom or lower end is placed or supported a foraminated or perforated metal or glass plate, E, covering said air opening or passage e' , to distribute or diffuse the incoming air or oxygen, and which also has the effect measurably to abate or break the force of the draft.

I do not confine myself strictly to the use of the hooks D^2 for suspending the globe, as any suitable means may be employed for the same purpose.

Within the lower end of the chimney or stack is also disposed a spider, F, which is connected to and supported upon the gas-pipe C by means of a sleeve, to which its arms are connected, said sleeve being screwed upon said gas-pipe. The spider also effects the abatement or reduction of the draft.

G is practically a hemispherical or other suitably-shaped dome or cap, by the removal of segments from which, at its lower edge, are formed feet or short legs g , the recesses or openings provided by the removal of which segments also forming air-passages, which feet rest upon the upper edge of the chimney or stack A, or upon the inner edge of the capital a of the said column-shaped chimney or stack A, as readily understood by the drawings. In common with the aforesaid parts e' F, the said dome is also contrived for the partial abatement of the draft, whereby it will be seen that the draft is thoroughly controlled or regulated and uniformly or evenly distributed throughout the burner, to properly feed the flame, while the combustion is augmented by the hot-air feeding contrivance, thus securing a maximum flame with the consumption of a minimum quantity of gas, which lessens the accumulation of unconsumed products of combustion—as soot, smoke, &c.—and economizes in expense, labor, and trouble in keeping the lamp clean.

H is an ordinary gas valve or cock, supplied to the gas-pipe above the dome or roof G, for cutting off or turning on the supply of gas. To the outer end of the key or plug of the

valve H is applied a lever, H', with two long arms to effect the ready actuation or turning of the valve, to the ends of which lever are, in practice, connected cords, chains, or wires, extending down within convenient distance of the attendant, for the ready manipulation of the lever in opening and closing the valve. In either arm H' is provided a suitably-threaded orifice, adapted for reception of a corresponding set-screw, H³, therein disposed, with which the cock H is adjusted to regulate the flow of gas at night, and also its flow in the day time, allowing escape of a small quantity thereof for producing a blue flame.

It will be understood that I do not limit myself to the precise construction and arrangement of the parts as herein shown and described, as it is obvious that numerous changes in the details may be made without violating the spirit of my invention.

The cap f, immediately beneath the lugs F, is enlarged in diameter, in order that it may project out and thus prevent too great flow of air out through the apertures at the top of the dome of the hot-air or oxygen chamber.

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

1. In a regenerative gas-burner, the burner having a central nozzle, a series of radial gas-passages extending through the arms of a spider-like bottom of the burner, and an inner and outer wall, the latter fitted with a cylindrical casing and said inner wall having an annulus or deflector fitted upon an offset or shoulder, in combination with the hot-air or oxygen chamber having in its sides a series of segmental slots or apertures and a series of passages or slots in its lower cylindric end, said chamber being secured on the gas-pipe and its lower end located within a central compartment of the burner, substantially as shown and described.

2. In a regenerative gas-burner, the combination, with the hot-air or oxygen chamber having in its sides a series of segmental slots or apertures and a series of passages or slots in its lower cylindric end, and the burner hav-

ing a series of radial gas-passages extending through the arms of a spider-like bottom, and the annular chamber formed between the inner and outer walls of said burner, of the chimney suspended by hooks connected to the bell-shaped cap and the dome disposed on the top of the capital or column, said capital being connected to the gas-pipe, substantially as shown, and for the purpose set forth.

3. The combination of the capital or column, the dome disposed thereon, the chimney having an opening or passage and a perforated plate in its lower end, the hooks connected to the cap for securing the chimney by entering sockets formed in the outer upper surface thereof, the burner, and the hot-air or oxygen chamber secured on the gas-pipe within said chimney, substantially as shown and described.

4. The combination, with the burner having an annular chamber and a series of radial gas-passages, of the hot-air or oxygen chamber silvered, nickel-plated, or enameled on its outer periphery, having in its sides a series of segmental slots or apertures and a series of passages or slots in its lower cylindric end, said chamber having its lower end located within said burner, and connected to the gas-pipe, substantially as shown, and for the purpose described.

5. In a regenerative gas-burner, the combination of the burner having an annular chamber, a series of radial passages extending through the arms of the spider-like bottom in communication with a central gas-pipe nozzle, and the hot-air or oxygen chamber having in its upper flared surface air passages or slots and the lower cylindric end provided with passages or slots resting upon said gas-pipe nozzle, and adapted to provide a narrow passage between itself and the inner wall of the combustion-chamber, substantially as and for the purpose set forth.

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

WILLIAM S. MEAD.

Witnesses:

J. NOTA MCGILL,

HOWARD J. SCHNEIDER.