

(No Model.)

E. B. DENNY.

GAS BURNER.

No. 260,746.

Patented July 11, 1882.

Fig. 1.

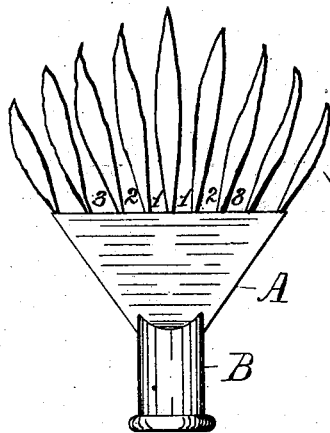


Fig. 8.

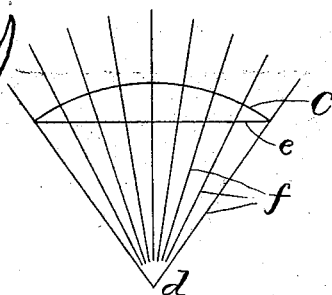


Fig. 2.

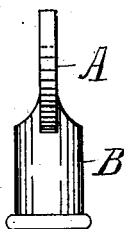


Fig. 6.

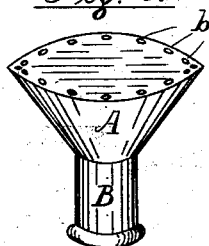


Fig. 3.

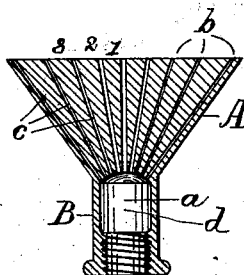
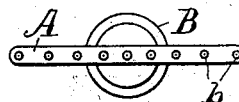


Fig. 5.

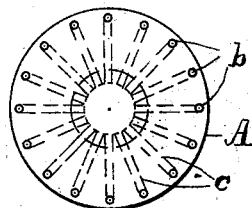


Fig. 7.

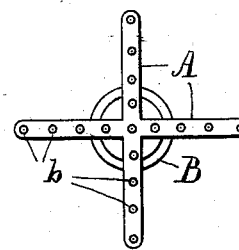


Fig. 4.

Attest:

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UNITED STATES PATENT OFFICE.

EDWARD B. DENNY, OF NEWARK, NEW JERSEY.

GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 260,746, dated July 11, 1882.

Application filed November 4, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. DENNY, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Gas-Burners, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

My invention relates to an improvement in gas-burners, and is fully set forth in the annexed description and drawings. It is especially adapted to burning the mixture of atmospheric air and gasoline vapor known as "air-gas" or "gasoline-gas;" and the object of the invention is primarily to subdivide the flame into a number of small jets in the closest possible proximity to one another, and by thus securing a greater contact of such flame with the surrounding air to obtain a more perfect and complete combustion of the gas conjointly with a high degree of light and heat in the flame. The close proximity of the jets produces a much more concentrated and brilliant light than the same number burning at a distance from one another; and I have discovered that to produce the desired separation the jets of gas must diverge from one another as they emerge from the outlets of the burner, and that to secure such divergence the channel leading to each orifice must be at least eight times as long as the bore of the outlet. The construction I have devised to effect this object is shown in the annexed drawings, in which—

Figure 1 is a side view, and Fig. 2 an edge view, of one form of my invention designed to produce a flat flame. Fig. 3 is a plan of the same; Fig. 4, a plan of a burner adapted to produce two flat flames intersecting one another at right angles. Fig. 5 is a vertical section of either Figs. 3 or 4 on a line through the center of the outlets. Fig. 6 is a perspective view, and Fig. 7 a plan, of a burner adapted to produce a circular flame, and Fig. 8 a diagram illustrating the spacing of the outlets.

I am aware that burners are already known with separate jets carried at the ends of separate tubes or branches; but my burner consists of a single head containing the outlet-channels and a neck containing a feeding-channel

and provided with the usual screw-thread for convenient attachment.

A is the head; B, the neck; *a*, the feeding-channel; *b b b*, the outlets, and *c c c* the channels leading from *a* to *b*. The channels *c c c* all radiate from a central point, as *d*, to their respective outlets *b b b*, and the feeding-channel *a* is therefore made large enough to afford a separate entrance into it for each of the channels *c c*. In the circular burner with cone-shaped head shown in Fig. 6 the channels *c* would all be exactly of one length, and the gas would be discharged equally from all the outlets. In the flat burner shown in Figs. 1, 2, 3, and 5 the outlets are unavoidably of different lengths, and to prevent the shorter central ones from blowing when the gas is supplied freely I form their channels *c c* of larger bore than those at each side; and thus secure a perfect jet from each outlet under the same pressure. This results from the lower velocity of the gas escaping from the central jets and the bore's capacity to feed a longer jet.

I am fully aware that many burners have been made containing a series of outlets connected with a single feeding-channel; but in all such burners there is no efficient means provided to make the jets diverge from one another outside the outlets, and the separate jets therefore mingle together in one or several flames, and for lack of perfect combustion produce a defective light and a disagreeable odor when used with an air-gas like that from gasoline. Such burners have therefore usually required a shade or chimney to secure with such gas even an imperfect combustion, while the burner described herein requires no chimney to burn such gas, but produces in the open air a flame of great whiteness and heat in comparison with that of other burners employing chimneys, and produces no odor or other evidence of imperfect combustion.

It is obvious that the separate jets are more perfectly aerated than if combined in one continuous flame fed from the several outlets, as the adjacent sides of the separate jets would then be in contact with one another instead of with an atmosphere of pure air, and, as they can only be conveniently combined in one head and made to burn separately by the diverging

channels herein described, it is plain that the essential feature of my invention is the combination of such diverging channels with a single head, whereby the division of the flames and concentration of the light are conjointly secured.

Such channels as I have described are readily distinguished from a series of holes formed in the side of a tube, as in Argand and annular burners; or in a curved plate, as in certain segment-shaped burners, for none of these constructions produce a series of diverging jets in close proximity to one another; but their flames are united together in just the manner to lose the perfect aeration secured by my construction.

My burner is also readily distinguishable from any collection of separated jets screwed or secured to a common base and supplied by a common feeding-channel in such base, as all such collections of jets produce a much more diffused light than that attainable by my device, wherein the jets are brought into close proximity without flowing together, and thus produce the most concentrated light.

With the burners heretofore devised for burning gasoline-gas it has been very difficult to use any reflectors, as such burners and reflectors are usually situated under ceilings or in places difficult to reach for lighting and regulating. My burner requires no regulating under varying pressures, as the flame is so fully exposed to the air, and as the flame flares, as shown in Fig. 1, it is peculiarly adapted to use where the light must flash from one burner to another, as in reflectors. For both of the reasons last stated a reflector may be applied with the utmost ease and advantage.

In the flat-topped burners shown in Fig. 1 it will be observed that the space marked 1 between the middle two outlets is smaller than that separating the next pair, as 2, which is in turn smaller than the next space at 3. This construction is desirable from the increasing angle at which the channels *c c* intersect the top of the burner from the middle outward. This will be understood from the diagram in Fig. 8, where *d* represents the center of the diverging channels, *e* the top line of the head *A* in Fig. 1, and *C* an arc of a circle drawn from *d* as a center and passing through each end of line *e*.

Lines *f*, drawn from equal divisions in the arc *C*, intersect the line *e* into divisions gradually increasing from the center outward, and it is therefore necessary to arrange the holes *b b* similarly to bring the several jets at equal distances apart.

The head *A* might of course be formed with an arched top like the curve *C* and the outlets be spaced at equal distances apart; but in such case, as in that of the annular burner shown in Fig. 6, the several parts of the adjacent jets would all be at the same distance from their respective outlets and moving at the same velocity, and therefore more likely to

mingle into one combined flame than the jets emerging from the head shaped as in Figs. 1 and 5. The straight-topped burner, constructed to form a flat flame, is therefore the best adapted to carry out my invention, the several jets moving at different velocities at their adjacent sides, and thereby being better adapted to maintain the flames distinct from one another in close proximity. The burner shown in the said figures is also preferable to any of the other forms illustrated, not only as securing the most perfect aeration of the jets, but as casting the smallest shadow in any direction around the burner, and as being the smallest in bulk for the size of flame produced.

It is found in practice that if the jet-outlets are made large enough to give a good light with an eight-candle-power gas it will give the same light with a forty-candle gas when burning only a proportionate amount of the latter. It is also found that it will burn equally well with the high pressure required for poor gas and the low pressure required for rich gas, both of which are produced from a charge of gasoline in most gas-machines at the later and earlier stages of its vaporization. It is obvious therefore that my burner requires no regulator attached to its cock, and that in both the cases just cited the perfect combustion secured is produced by dividing the flame and exposing it to the surrounding air and to the heat of the adjacent flame simultaneously.

From the above description it is obvious that in my flat-topped straight-flamed burner (shown in Fig. 1) I secure an economy in space at the base of the flame as compared with its size at the top, resulting in scarcely any shadow from the burner as contrasted with others for burning gasoline-gas, and that this result is secured by so directing the jet before it leaves the outlets that its gas shall be consumed before its natural vertical inclination brings it into contact with its neighbor.

Although I have only shown the burners illustrated as if constructed of one solid piece of metal, I do not limit myself to such construction, as the same results can be secured by the use of a lava tip, properly drilled or formed with diverging channels, and secured in the head of the burner in any convenient manner. The burner may also be made of any other combination of materials, provided the diverging channels, which are the cardinal feature of my invention, are suitably disposed.

It is obvious that the row of outlets in the flat burner may be arranged in a zigzag line, as well as the straight row shown in the drawings. The result would be nearly the same in such case, and the light of the several jets would tend to obliterate the shadow of the burner still more effectually.

I therefore claim my invention in the following manner:

1. The combination, in a gas-burner having the single flat head *A*, of a row of outlets, *b*,

supplied by diverging channels *c*, the whole operating as and for the purpose set forth.

2. The combination, in a gas-burner, of the neck B, containing a feeding-channel, and the
5 head A, consisting of a flat plate formed with flat top containing the row of outlets *b*, and provided with diverging channels *c*, connecting the outlets with the feeding-channel, substantially as and for the purpose described.

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

EDWARD B. DENNY.

Witnesses:

GEORGE H. DENNY,
THOS. S. CRANE.