Samuel Darling's

Improved Gas Heater.

73957

PATENTED
FEB 4 1868

Fig. 1.

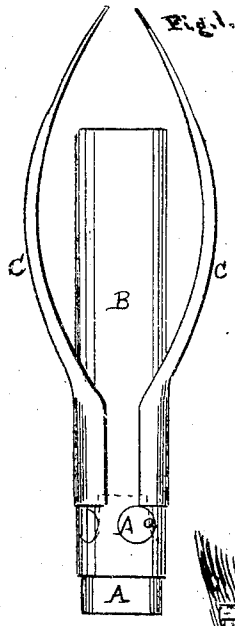


Fig. 2.

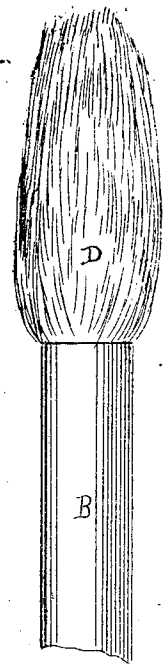


Fig. 3.

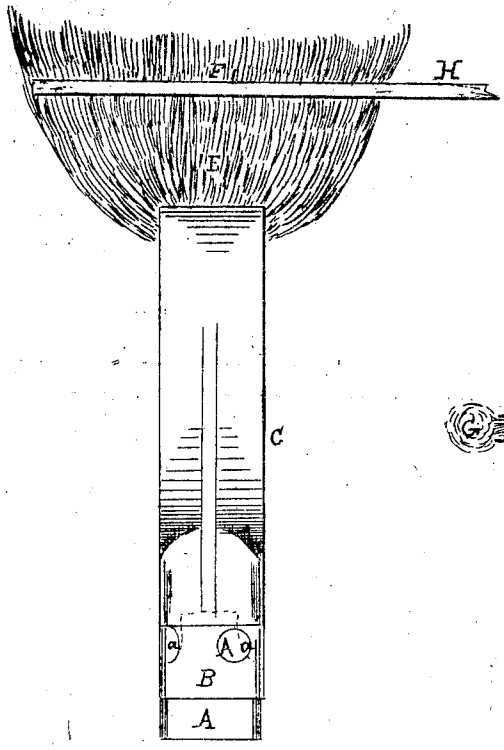
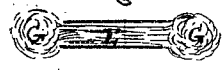


Fig. 4.



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United States Patent Office.

SAMUEL DARLING, OF BANGOR, MAINE.

Letters Patent No. 73,957, *dated February* 4, 1868.

IMPROVEMENT IN GAS-HEATERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, SAMUEL DARLING, of Bangor, in the county of Penobscot, and State of Maine, have invented certain Improvements in Apparatus for Directing and Concentrating the Heat of Gas-Burners; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practise it.

In machine-shops and factories, it is often found necessary to heat small pieces of iron, steel, or other hard metal to a temperature higher than can be attained from the flame of an ordinary gas-burner, or other flame designed merely for illuminating purposes; and if there be a forge, or portable forge, upon the premises, or near at hand, it is not always available, because the fire is not constantly kept up, and to rebuild it expressly for such little jobs of repairs, alterations, &c., as are frequently demanding the attention of the workman, or to send to a distant shop for the purpose, or to postpone it for a more convenient season, would be productive of expense, delay, and cost not warranted by the occasion.

Efforts have been made to meet such emergencies, by placing over a gas-burner a tube projecting some little distance beyond it, and having in it air-inlet orifices to increase the current of atmospheric air, confine it and the flame within defined limits, and so intensify the heat. But it is found, by experience, that the heat thus created, although greater and more serviceable than that derived from the use of the burner only, is still so limited in degree as to serve but for a very small range of work, and altogether to preclude its use for most of the purposes for which such a substitute for a forge is needed.

My invention is intended to supply this need, and it consists in appending to such a tube, and on opposite sides of it, two pieces of metal which I call "concentrators," the object and function of which are to flatten and concentrate the flame emerging from the tube, and so to increase its heating powers as to render it an invaluable implement. In the drawings accompanying this specification, and forming part of the same—

Figure 1 represents a gas-burner of ordinary construction, and a tube with my "concentrators" applied thereto.

Figure 2 represents the tube as ordinarily used, and without my "concentrators" applied. It also represents the form, but only about one-half the length of the flame emerging from such a tube.

Figure 3 represents another view of my improvement, as shown in fig. 1, and also the form and direction given to the flame by my "concentrators," and also its action upon a piece of metal submitted to such flame.

Figure 4 represents a top or end view of the "concentrators," and also of the flame as concentrated and confined by them.

The "concentrators" may be made of any suitable metal, but I prefer to make them of sheet iron. They may be attached to the tube in any secure manner, but I prefer to rivet them thereto in any of the known methods of doing such work, and they should have a breadth about equal, at least, to the diameter of the tube. They should extend about one inch above the tube, and should be so bent or curved as not to come within an eighth of an inch of the upper end of the tube, whilst their upper free ends or tips should be about a quarter of an inch apart. The tubes may be made of brass, sheet iron, tin, or any other suitable metal.

The length of the tube, its diameter, and the inlet-holes for the passage of air, should be proportioned about as shown in the drawings, in which A, represents a gas-burner; B, the tube placed over the same; C, the "concentrators;" D, a portion of the flame issuing from a tube to which my "concentrator" has not been applied, but much shortened below the actual length of such flame; E, the bluish, and F the whitish portion of the flame after passing between the lips of my "concentrator;" G, the bulging portion of the flame not confined between these lips; H, a bar of metal presented to the flame to be heated; and *a*, the openings or air-inlet orifices in the tube, and which should be below the tip of the gas-burner. If desirable, a rest or support for the article to be heated may be put up in convenient proximity to the burner.

Is is found in practice that my concentrator applied as above described, causes a bar of steel, one-half inch in diameter, to become red hot in five minutes, and in two minutes will heat a bar, one-quarter of an inch in diameter, sufficiently to be hardened, but the tube without my improvement will scarcely heat a bar, of a half inch diameter, red hot, in any length of time.

With such an apparatus in machine-shops, the workmen, instead of being dependent upon the forger, or waiting upon his convenience or ability to attend to their calls, when tools need repairing or retouching, can repair and harden their own drills, chisels, &c., at a moment's notice, and without dependence upon any other person, or upon any contingency, except a supply of gas. There should be sufficient pressure or head of gas let on, before applying a match, to prevent the flame running back into the tube.

A very important feature of this improvement is that it never overheats the steel; and it is well known to be a difficult matter to heat small pieces in a common forge without injuring the steel. Not only, therefore, is it evident that all such work can be done much better by my heater than it can be in a forge, but that it can be done very considerably cheaper, especially when it is considered that very frequently work must cease until a drill or other tool is hardened, and a fire must be made up, even though the drill be but an eighth of an inch in diameter. This takes much time, perhaps of several workmen, and considerable loss of coal, which must then burn out unused. These heaters will, I feel confident, save hundreds of dollars yearly in some of our large machine-shops.

It will be observed that the effect of my appliances is not only to flatten, but also to widen the flame, as well as to increase its heating power. This enables me to heat a greater portion of the length of bar than is possible with the use of the tube alone; and by directing all the flame that passes between the concentrators directly upon the bar, but little of the heat is lost by spreading over its sides, whilst it is probable also that the curved inner faces of the flat concentrators serve to create an additional current of atmospheric air towards the flame, beyond that created within the tube, and that the oxygen derived from this current, coming directly to the heated flame, aids combustion to a higher degree than the air within the tube, which intermixes with the gas before reaching the flame at the outlet of the tube. Whatever may be the true theory, practice demonstrates the efficiency of my improvement in a very marked manner.

Instead of using a single tube, or any particular form of tube, or of concentrators, I propose to vary their number or form, as may be found desirable or convenient, as occasion may demand, so long as the essential feature of my invention, as above described, is employed. In some cases it will be important or necessary to have a number of burners (with my improvement) arranged in rows or gangs, or the tubes may, instead of being in such a row or gang, be made with one long flame-discharging opening, such as would be represented by a larger tube, so flattened as to have two parallel sides, and the flame may be let into such tube or pipe in any convenient manner. There may be also a partial casing or shield around or over the flame, to prevent the escape of heat and too great a rush of cold air upon the article being heated. Such case or casing may also serve as a means for holding the article while being heated, and to shut off from the eyes of the operator the intense glare of the red-hot metal.

I claim the combination, with the tube of a "gas-heater," of flame-confining guides, substantially as described.

SAMUEL DARLING.

Witnesses:

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ALBERT W. PAINE.