(No Model.)

J. E. KARNS.

GAS BURNER FOR HEATING AND METALLURGICAL PURPOSES.

No. 288,445. Patented Nov. 13, 1883.

Fig. 1.

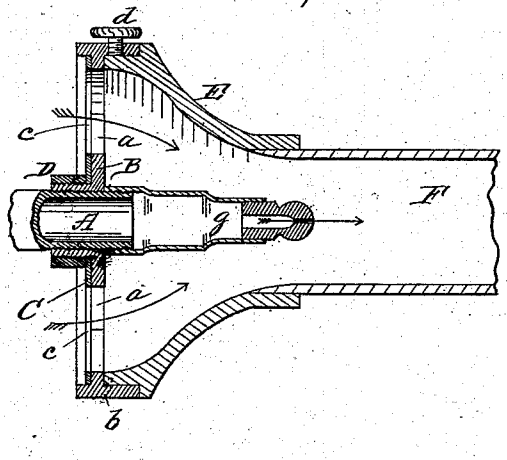


Fig. 2.

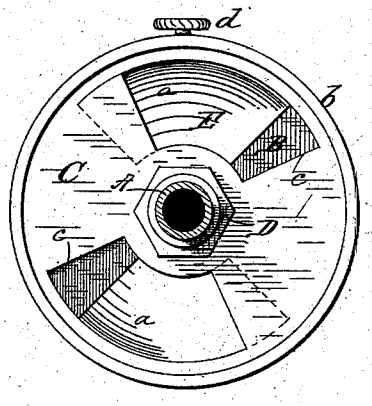
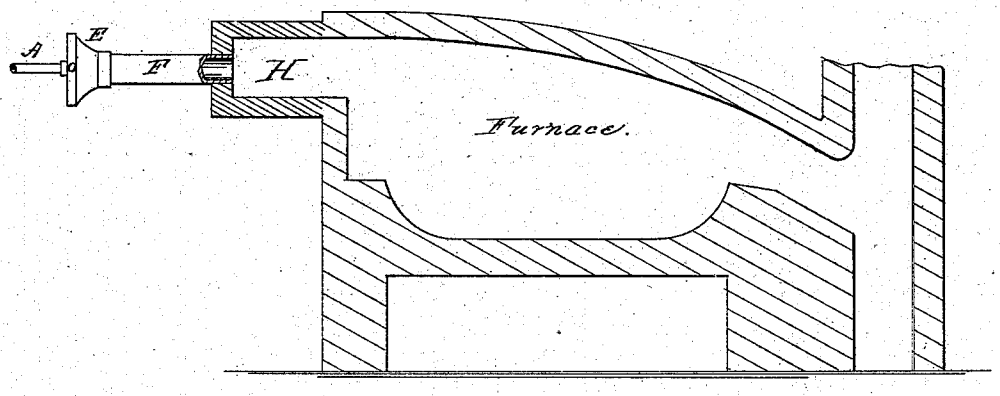


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES E. KARNS, OF APOLLO, PENNSYLVANIA.

GAS-BURNER FOR HEATING AND METALLURGICAL PURPOSES.

SPECIFICATION forming part of Letters Patent No. 288,445, dated November 13, 1883.

Application filed June 4, 1883. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. KARNS, of Apollo, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Burners for Heating and Metallurgical Purposes; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 is a longitudinal section of my improved burner. Fig. 2 is a front view, and Fig. 3 is a section, of a furnace with my burner and combustion-chamber.

This invention relates to the utilization of hydrocarbon gases, naturally or artificially generated, for heating and metallurgical purposes wherever applicable.

The invention consists in the arrangements and combinations of devices hereinafter described and claimed.

The invention comprises the construction of the burner, its combination with a cone or funnel to act as a species of injector to draw air, a regulator for the amount of air drawn, a mixing-chamber wherein the gas and air become thoroughly intermingled, and a combustion-chamber.

In the drawings is illustrated the simplest form of my invention.

A is a threaded pipe, which screws into and through the center of a plate, B, whose web is made with one or more sectoral openings, *a*, and which has the flange or rim *b*. Fitting on the hub of plate B is a similar plate, C, having one or more openings, *c*, corresponding to openings *a* of plate B. The plate C is free to revolve on said hub, but is capable of being locked in any desired position by means of the nut D screwing on the hub or the pipe A. A cone, E, fits into the rim *b* closely, and is held securely therein by one or more thumb-screws, *d*, as shown. Into the small end of cone E, I drive or screw the tube F, which I call the "combining-tube." On the inwardly-projecting end of pipe A, I screw an ordinary slitted gas-burner, *g*, as shown, the burner *g* being thus arranged in the axis of the cone E and tube F. Thus constructed, the device acts like an injector. The gas, coming under pressure through the tip or nozzle *g*, spreads out in a flat stream and acts powerfully upon the air around it, with the result of drawing a large volume of air in through the openings *a c*. The area of these openings will be regulated to suit the circumstances by rotating the plate C more or less, and thus contracting or expanding the opening. The air thus drawn in is struck by the stream of gas and whirled through the tube F, wherein the air and gas become thoroughly intermingled and are in condition for complete combustion.

To adapt the device for heating or metallurgical purposes, I fit it with the enlargement or combustion-chamber H, which I find it best to construct of the finest and most refractory fire-brick. The enlarged combustion-chamber H affords the necessary space for the expansion of the gases of combustion, so that the combustion may be complete and perfect before the product—heat—is projected into the furnace proper, and therefore the natural result of a too confined space for such expansion of the gases by the heat of combustion is avoided—namely, a premature projection into the furnace proper of the heat, which in such event will fall far short of its theoretical value. As an instance of the effect produced in this way, I can say that with what is known as a "ten-foot" gas-tip, with moderate pressure of gas, I have maintained a constant pressure of sixty-five to seventy-five pounds of steam in the boiler of a fourteen-horse-power engine, the latter operating steadily. Such a result, to my knowledge, has been unaccomplished previous to my invention. If the nozzle *g* need replacing, or any repairs or adjustment be required, I have only to turn the screw *d*, whereupon the apparatus may be withdrawn from the cone E and any change or repair made in a few minutes.

The combining-tube being interposed between the nozzle *g* and the heat, and having a current of cold air and gas, does not permit any destructive influence to work upon the air and gas injecting devices; hence they are very durable.

Another advantage is in the fact of the gas-tip being removable. If the pressure of gas

changes or a greater or less delivery be desired, I can fit in a suitable nozzle in a few moments.

I claim as my invention—

The combination of the plate B, having rim *b*, and carrying the nozzle and adjusting devices, with the cone E and set-screws *d*, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JAMES E. KARNS.

Witnesses:
T. J. McTIGHE,
T. J. PATTERSON.