(No Model.)

# S. COOK & J. H. PIPER.

## GAS BURNER.

No. 266,676. Patented Oct. 31, 1882.

Fig. 5.

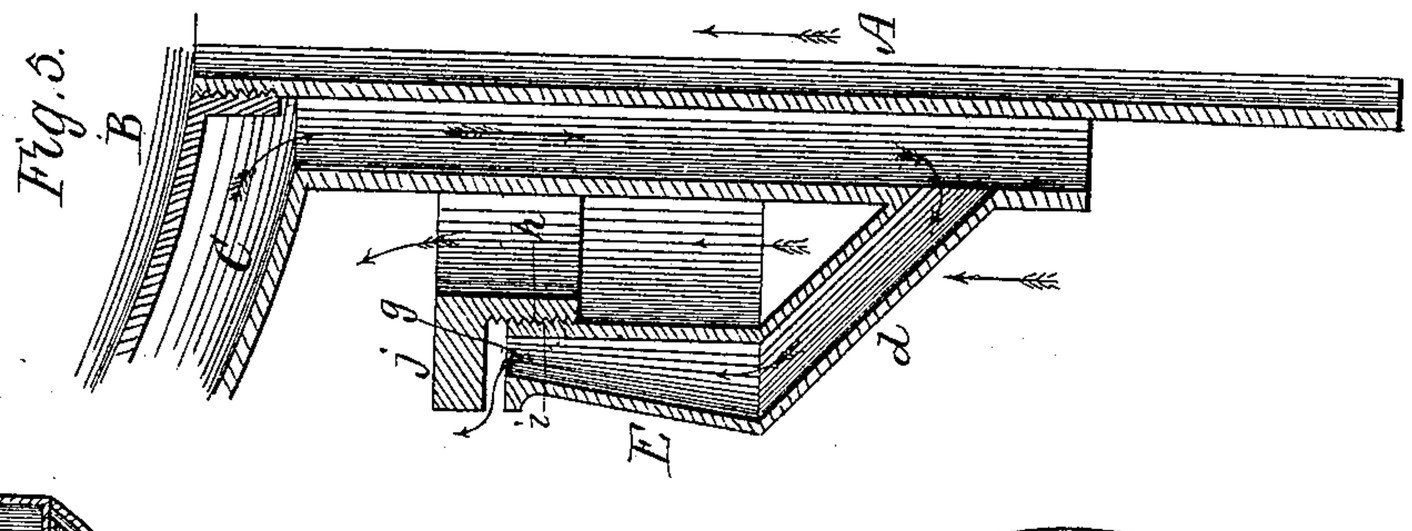



Fig. 3.

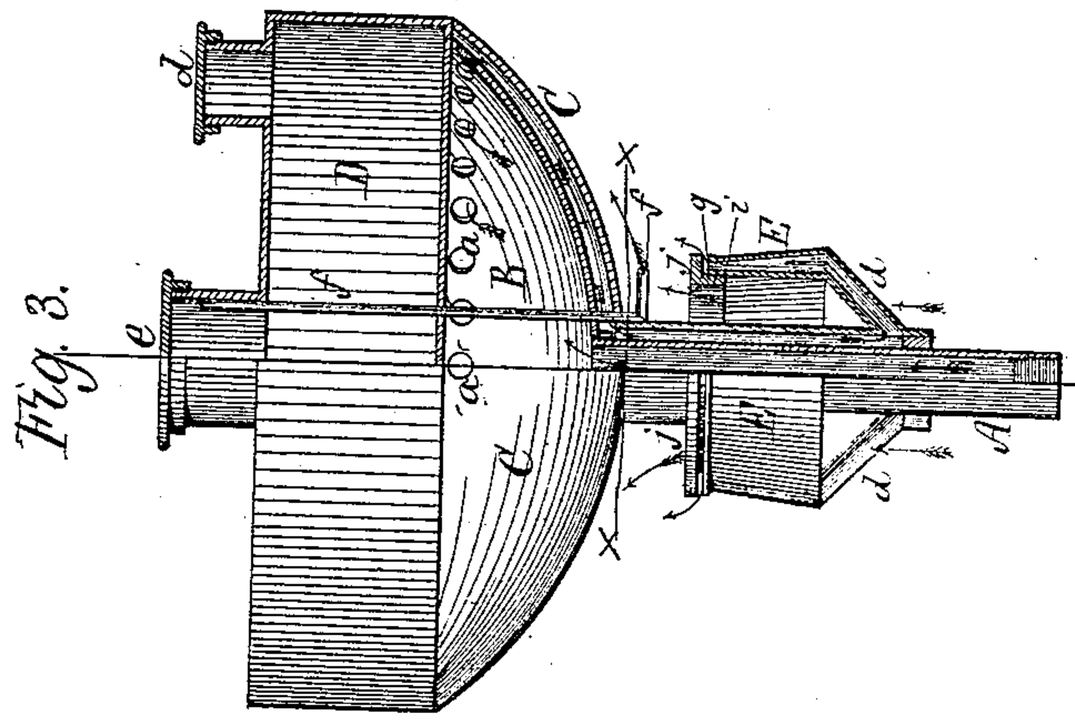



Fig. 4.

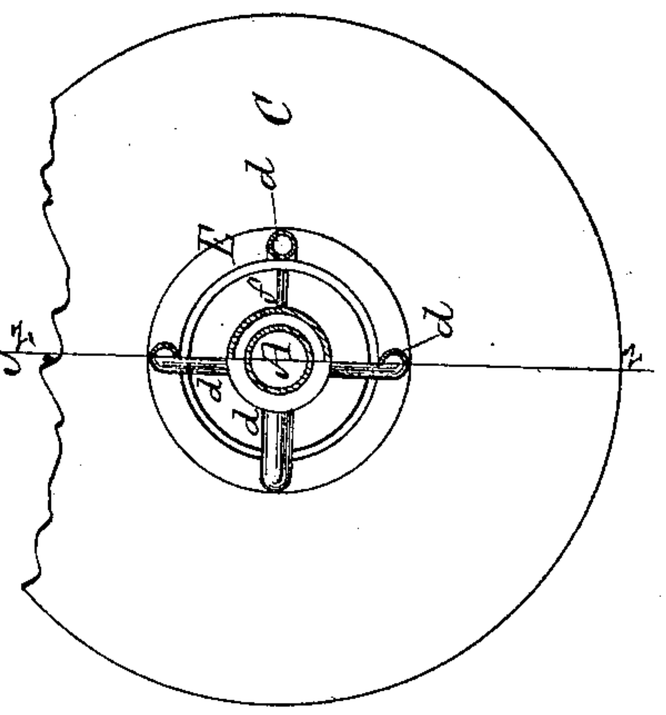



Fig. 1.

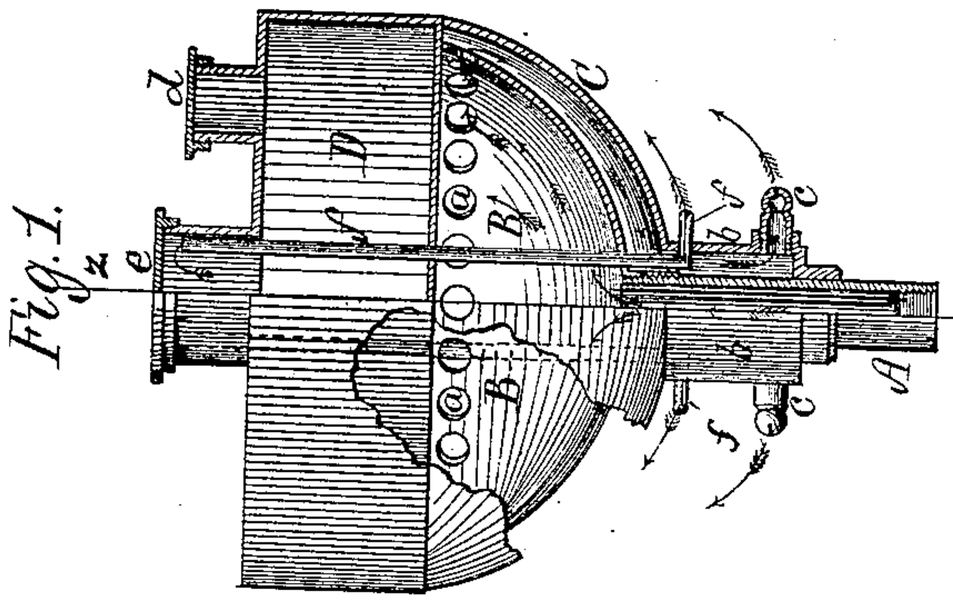
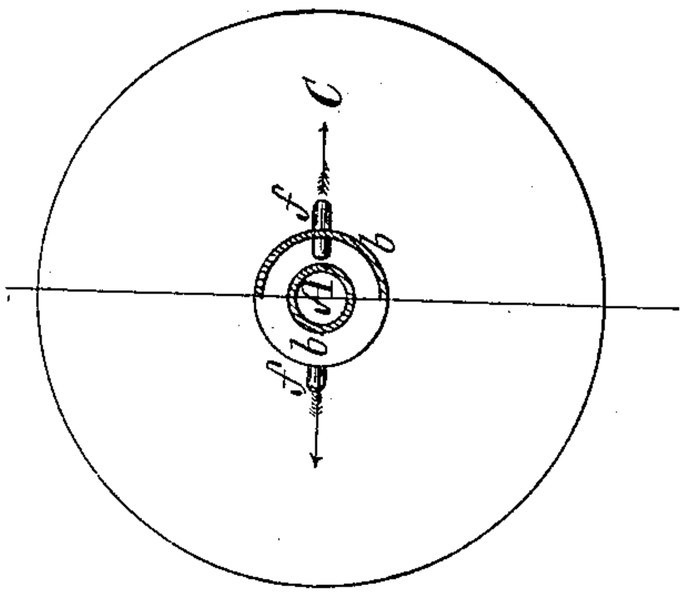



Fig 2.

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# UNITED STATES PATENT OFFICE.

SIDNEY COOK AND JOHN H. PIPER, OF BOSTON, MASSACHUSETTS.

## GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 266,676, dated October 31, 1882.

Application filed March 18, 1882. (No model.)

*To all whom it may concern:*

Be it known that we, SIDNEY COOK and JOHN HENRY PIPER, citizens of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Gas-Burners; and we 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates especially to gas-burners in which the gas is superheated by its own flame, in order that it may reach the burners in the best possible condition for perfect combustion.

The drawings accompanying this specification represent, in Figure 1, a sectional elevation, and in Fig. 2 a part bottom view and part horizontal section, of a burner containing our improvements, said view being taken looking upward; and Fig. 3 in such drawings is a vertical section on line *z z* of Fig. 4, the upper part corresponding to a vertical section on line *z z* of Fig. 1, and Fig. 4 a horizontal section on line *x x* of Fig. 3, of an Argand burner containing our improvements, the latter view being represented looking upward. Fig. 5 represents an enlarged vertical section of a part of an Argand burner similar to that shown in Fig. 3, to which our invention has been applied.

Reference being had to Figs. 1 and 2 of the above-named drawings, A will be seen to represent the inlet end of a gas-distributing pipe, the upper extremity of such pipe terminating in a hollow semi-spherical head or bulb, B, having a series of peripheral openings, *a a*, &c., in its upper part for escape of gas entering such bulb from the pipe A.

Surrounding the bulb B will be seen a semi-spherical closed drum, C, terminating at bottom in a tubular hub, *b*, which, at its extreme lower part, tightly incloses the gas-pipe A, this hub *b* containing a series (preferably four in number) of ordinary gas-burners, *c c*, &c., radiating from it and communicating with its interior. Gas admitted under pressure to the pipe A flows into the bulb or head B, thence by way of the openings *a* into the chamber C and annular hub *b*, and finally issues at the burners, provided the cock of the pipe A is open. The jets of gas from the burners being ignited, the heat from the flame radiates about the exterior of the drum C, and superheats the gas in its transit through such drum, the gas being thereby presented to the burners in the best condition to obtain the most effective combustion and the highest illumination. Coal-gas, if consumed too rapidly to allow time for the separation and ignition of its carbonaceous matter, loses in illuminating-power. By the employment of the drum C as a receiver for the gas we permit such gas to expand, and by sealing the drum we provide against the admixture of air and gas, which would accelerate the combustion to too rapid an extent. The heat evolved from the inflamed gas at the burners flows about the exterior of the drum C and heats the interior of the latter to a high degree, and thus converting such drum into a heater, which serves to superheat the gas and present the latter to the burners in the most favorable condition to secure active combustion of its carbonaceous matter. For the same reason the perfect combustion of gas at the burner heats the carbon of the gas to whiteness, thereby imparting the highest illuminating-power. Until the gas inflamed at the burners has imparted the requisite degree of heat to the interior of the drum C, a certain amount of carbon is precipitated from the flame upon the exterior surface of the drum, and more or less carbon may be thus deposited at times from unavoidable causes—such as undue draft of air, &c.—no matter how perfect the combustion is in other respects. To effectually remove and utilize this carbon, we connect with the drum C, preferably by erecting the same upon its top, a closed cup or vessel, D, which constitutes a miniature steam-generator, this vessel having a suitable filling-orifice, *d*, and being provided preferably with a steam space or dome, *e*, from which a cluster or series of pipes, *f f*, &c., lead, and descend into and through the lower part of the drum C or the annular bore of the hub *b*, as shown in the drawings, and terminating upon the outside of the latter. Should carbon collect upon the exterior of the drum C to any appreciable extent, a small quantity of water is

poured into the vessel D and becomes vaporized, the steam thus generated being more or less effectually superheated in transit through the drum C, and finally issuing from the outlets of the pipes *f*.

The superheated steam issuing from the pipes *f*, as stated, mingles with the flame from the burners *c*, and its oxygen and hydrogen separate, the former aiding the combustion of the gas, while the hydrogen, having an affinity for the solid particles of carbon collected upon the drum C, takes up the latter, thus rendering such carbon combustible and utilizing it to aid in heating the said drum. The pipes *f* may be led about the outside of the drum C in lieu of through it, as shown; but we prefer the former arrangement. So, too, with regard to the apertures *a* of the bulb B, in lieu of being in the periphery of the latter, as shown, they may be in the top thereof, a space being provided in this case between such top of the bulb and of the drum C.

We do not confine ourselves to the exact construction or arrangement of these details, or to the precise construction and relative disposition of the bulb and drum, as we consider our invention in this respect to consist in the combination, with a gas-pipe, of a receiver in which the gas is allowed to expand, and, in heating this receiver by suitable means, to superheat such gas in its transit to the burners.

In Figs. 3, 4, and 5 of the drawings we have shown an Argand or annular burner adapted to receive our improvements. In this instance the gas-pipe A, bulb B, drum C, generator D, and steam-pipe *f* are employed, as in Figs. 1 and 2; but in lieu of the burners *c* we employ an Argand burner of original construction. The body of this burner is a cylindrical or annular tube or chamber, E, in the upper edge of which is created a contracted annular opening, *g*, or a series of holes, if preferred, while the upper mouth of this annular chamber or tube E is interiorly screw-threaded, as shown at *h*, to receive the exteriorly-screw-threaded shank *i* of an annular plate or ring, *j*, the body of which is situated over the orifice *g* of the chamber E. By turning the ring *j* in its seat in one or the other direction the amount of gas allowed to escape is regulated.

The burner-body E intercommunicates at its lower part with the interior of the drum C by radial pipes *d d*, uniting the two, while the air requisite to support combustion is supplied through the center of the body E and annular cap *j*.

The exterior of the drum C may be polished and plated to provide a reflecting-surface, and furnished with a globe or shade, the whole presenting a highly ornamental appearance.

The principle of our invention may obviously be applied, by slight modifications of construction, to Argand burners of the ordinary sort.

We are aware that it is not new to combine with a gas-pipe a compartment supplied by said pipe at the bottom, an incasing-drum which communicates with said compartment at the top, and burners which heat said drum, and therefore we do not claim the same.

What we do claim is—

1. The upper closed cup or vessel, D, in combination with the bulb B, the drum C, surrounding said bulb and communicating therewith by openings *a*, and the supply-pipe and burners, all substantially as set forth.

2. The combination, with a gas-supply pipe and a receiver connected therewith, to permit of expansion of the gas and heated by the gas inflamed at the burners attached thereto, of a steam-generator heated by such drum, and provided with steam-delivery pipes which deliver the steam from such generator to a point where it shall mingle with the flames of the burners.

3. In combination, the gas-supply pipe, the inner perforated receiver, the outer superheating-drum, the gas-burners connected with such drum, and the steam-generator connected with and heated by such drum.

4. In combination with a gas-supply pipe, a receiver which allows expansion of the gas from said pipe, and an Argand burner consisting of an annular body or chamber, a pipe or pipes communicating with the supply-pipe, and a cap or cover adjustable on the outlet of said chamber to regulate the flow therefrom, said burner being located in proximity to the receiver, in order that the burning gas may heat the latter and its contents.

5. The combination, with the Argand burner, consisting of the circular body or chamber, the annular cap screwing into the same and governing its gas-outlet, and the radial pipes connecting the annular chamber with the gas-supply pipe, of the inner perforated receiver, the outer superheating-drum communicating therewith, and the steam-generator, with its steam-delivery pipes arranged to direct the escaping steam to the flame of the burners.

In testimony whereof we affix our signatures in presence of two witnesses.

SIDNEY COOK.
JOHN HENRY PIPER.

Witnesses:
H. E. LODGE,
F. CURTIS.