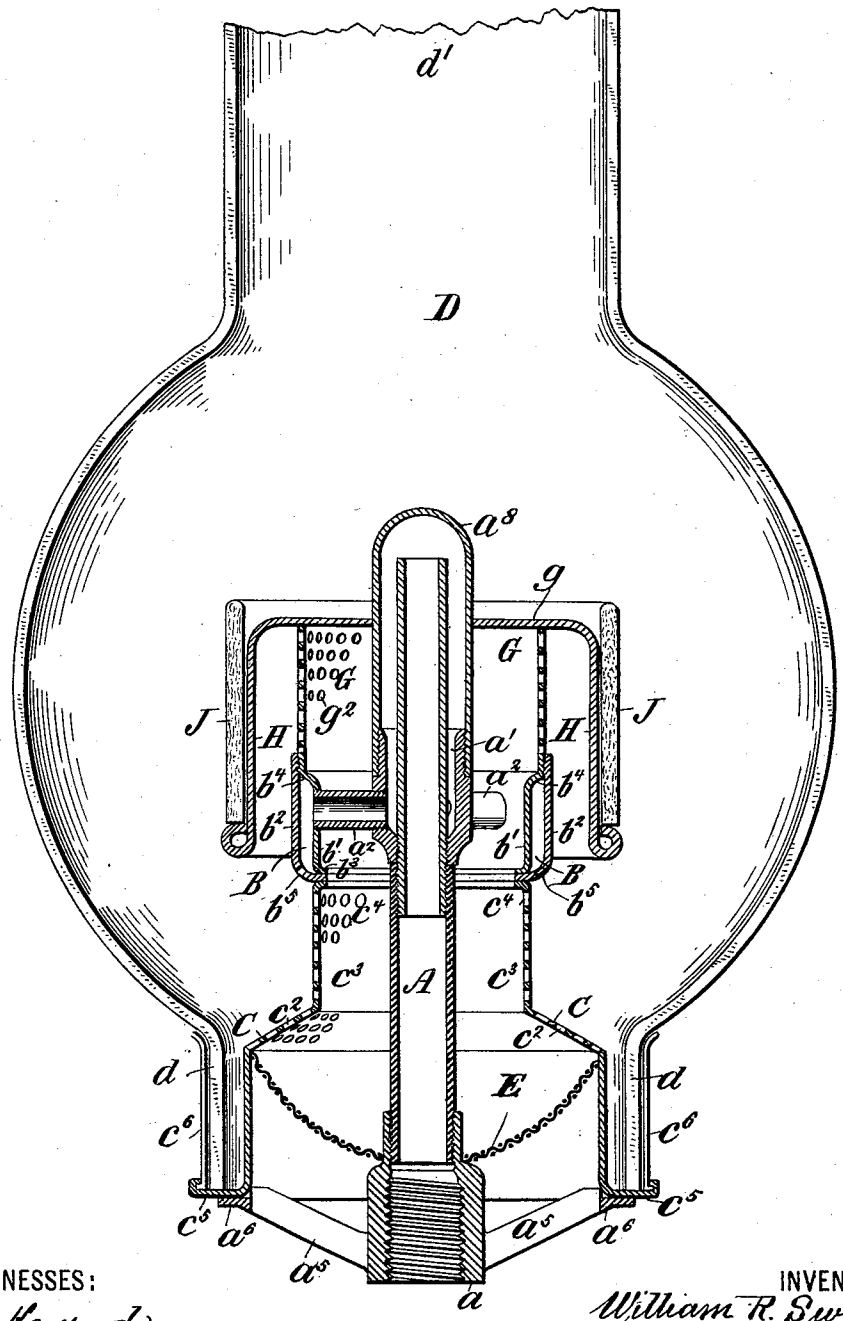
(No Model.)

# T. GORDON & W. R. SWIFT.

## REGENERATIVE BURNER.

No. 588,272. Patented Aug. 17, 1897.




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# UNITED STATES PATENT OFFICE.

THOMAS GORDON, OF PHILADELPHIA, PENNSYLVANIA, AND WILLIAM R. SWIFT, OF NEW YORK, N. Y.

## REGENERATIVE BURNER.

SPECIFICATION forming part of Letters Patent No. 588,272, dated August 17, 1897.

Application filed December 22, 1896. Serial No. 616,604. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS GORDON, of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, and WILLIAM R. SWIFT, of the city, county, and State of New York, have invented a new and useful Improvement in Regenerative Burners, of which the following is a specification.

We will describe a regenerative burner embodying our improvement and then point out the novel features in a claim.

The accompanying drawing illustrates in vertical section a regenerative lamp and burner embodying the features of our invention.

Referring to the said drawing in detail, A designates a gas-conduit, here shown as in the form of a pipe, provided at its lower end with a screw-coupling *a*, capable of engagement with a nipple of a gas-fixture. At the top of the gas-conduit A is a central gas-chamber *a'*, which is made in the form of a cap or hollow plug, from which extend radially a number of tubes $a^2$, serving to supply the gas to the gas-chamber B. The gas-chamber is of annular form, it being in the present instance made of two sheet-metal shells *b'* and $b^2$. The inner shell *b'* is engaged with the tubes $a^2$. A convenient way of engaging the tubes $a^2$ with the cap or plug *a'* is to provide the parts with screw-threads on their adjacent surfaces. The ends of the tubes which support the shell *b'* may be united with said shells by brazing. The lower edge of the shell *b'* is turned inwardly in the form of a flange $b^3$. That portion of the shell *b'* forming the upper portion of the gas-chamber B is turned outwardly to form a shoulder $b^4$. Above this shoulder the shell $b^2$ engages with the shell *b'*. At the lower extremity the shell $b^2$ is bent inwardly to lap under the flange $b^3$ of the shell *b'*. The lower portion of the shell $b^2$ is provided with perforations $b^5$, whence the gas issues in jets and is burned.

C designates a shell through which passes air necessary for combustion. It may be made of sheet metal, and, as shown, has at its lower cylindrical portion *c'* a contracted conical portion $c^2$ and a smaller cylindrical portion $c^3$. The upper extremity of the latter is turned inwardly to form a flange $c^4$, and this may bear against the inwardly-turned lower edge of the shell $b^2$, comprised in the gas-chamber.

We have shown the lower cylindrical portion *c'* of the shell C as provided with an integral outwardly-extending flange $c^5$, forming a gallery or support for the combustion-chamber, which in the present example of our improvement is made in the form of a glass globe D, provided with a cylindrical base portion *d*, that loosely surrounds the lower cylindrical portion *c'* of the shell C and surmounted by cylindrical portion *d'*. Spring-fingers $c^6$, extending upwardly from the gallery-flange $c^5$, impinge against the outer side of the cylindrical base portion *d* of the combustion-chamber D, thereby holding the same in place.

A convenient means of supporting the shell C, and consequently the combustion-chamber, consists in arms $a^5$, extending outwardly from the coupling *a* to a ring $a^6$, upon which the flange or gallery $c^5$ rests.

Preferably we employ in the lower part of the shell C a perforated or reticulated diaphragm E, so as to prevent air ascending in gusts.

Part of the air escapes from the perforations in the shell C, so as to supply air to the lower mantle or surface of the flame. Another portion of the air flows upwardly past the tubes $a^2$ to support the combustion on the upper mantle or surface of the flame. This portion of the air passes through the air-chamber G and thence to a deflector H, whereby air is directed against the flame.

The chamber G is formed partly by the cylindrical portion of the shell *b'*, forming part of the gas-chamber B, and partly by a cap *g*, surmounting said shell. The chamber G is provided with perforations $g^2$. The cap *g* may be made of sheet metal and integral with the deflector H.

We may also use a reflector J, consisting of an annular shell around the deflector H and resting upon an outwardly-turned flange or bead on the lower extremity of the latter.

The gas-conduit A is extended upwardly through the gas-chamber *a'*, and an elongated cap $a^8$ is fitted to such chamber on the outside of the body of the central gas-chamber *a'*

and engaged there by means of screw-threads. It extends considerably above the body of the central gas-chamber and projects into the upper portion of the combustion-chamber. The extension of the conduit A is shown as being made of a separate tube screw-threaded into the conduit A and also into the body of the central gas-chamber. This extension rises almost to the top of the cap $a^8$. By this arrangement of parts the gas rises through the central gas-chamber to the top of the cap $a^8$, where it is heated by reason of the fact that the cap $a^8$ is subjected to the heating action of the waste products of combustion in the chamber D, and then descends through the annular space between the extension of the gas-conduit A and the side wall of the cap $a^8$ until it escapes through the tubes $a^2$.

What is claimed as new is—

In a regenerative burner, the combination with a nipple for connecting with a gas-fixture, a gas-supply pipe extending upwardly therefrom to a point above the air-heating chamber, a shell surrounding said gas-supply pipe at its upper portion and forming therewith a return-conduit whose upper part is directly exposed to the heat of the waste products, a vertically-extended gas-burner chamber provided with a circular row of gas-outlet openings at its base, so that the supply of gas will be above the flame, a series of radial tubes communicating between the lower part of the return-conduit and the upper portion of the gas-burner chamber, a centrally-arranged air-heating chamber located above the annular gas-burner chamber, and having openings for the escape of air, a deflector supported by the air-heating chamber and extending downwardly so as to surround the annular gas-burner chamber, a globe-support below the burner and concentric with and sustained by the gas-supply pipe, a globe supported by the globe-support, and a shell surrounding the gas-supply pipe and extending from the globe-support to the base portion of the annular burner-chamber inward of its row of gas-outlets, so as to form with the inner wall of the gas-burner chamber, part of a conduit to the air-heating chamber, said shell having perforations for supplying air to the base of the burner, and also to the lower portion of the globe, substantially as specified.

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