

(No Model.)

3 Sheets—Sheet 1.

T. THORP.
REGENERATIVE GAS BURNER.

No. 496,586.

Patented May 2, 1893.

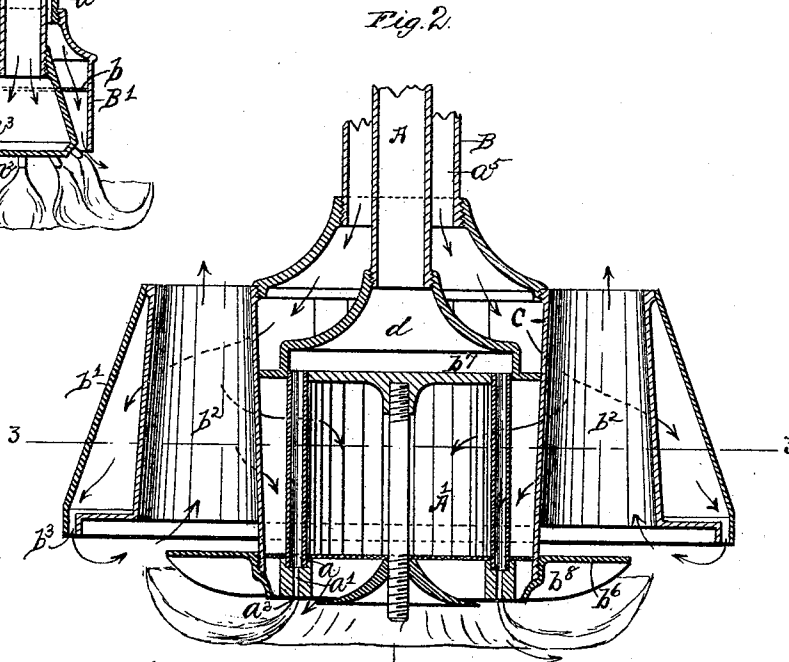
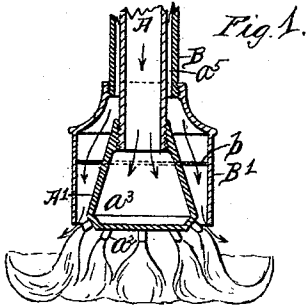
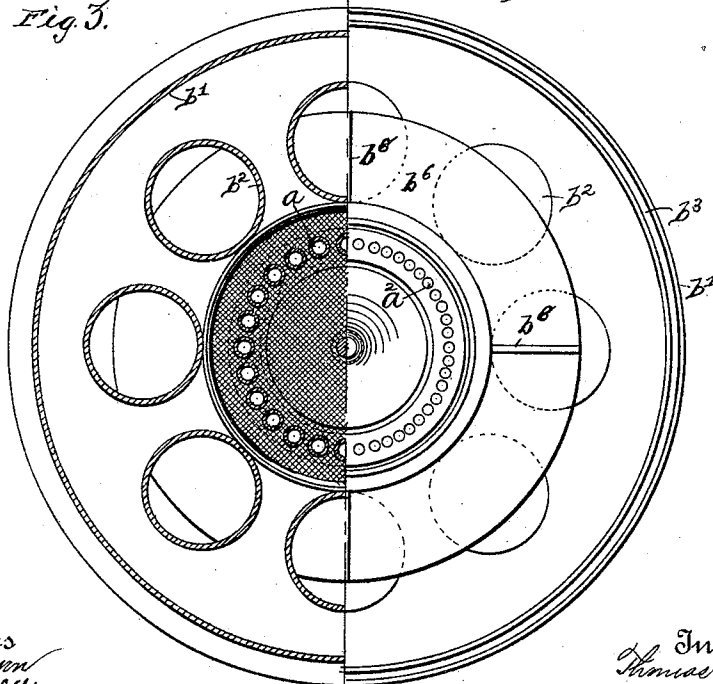


Fig. 3.



Witnesses
Edw. H. Brown
Wm. M. Cluff

By his Attorney

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Edw. H. Brown

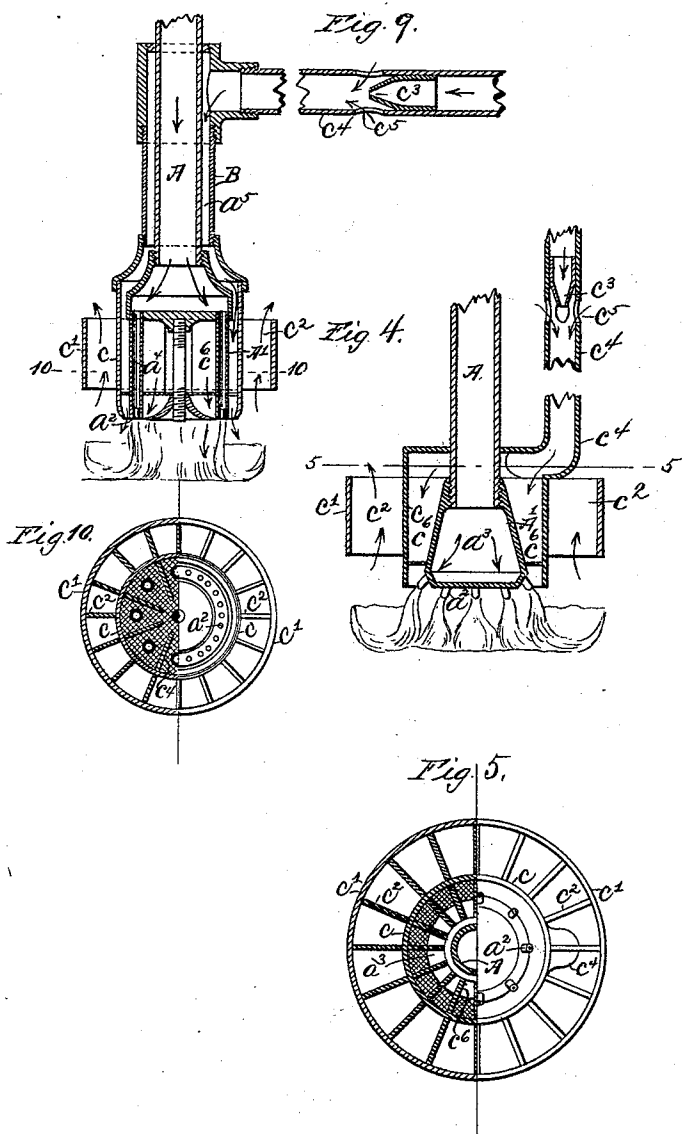
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Fig 6

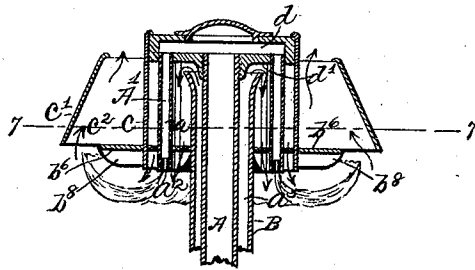


Fig 7

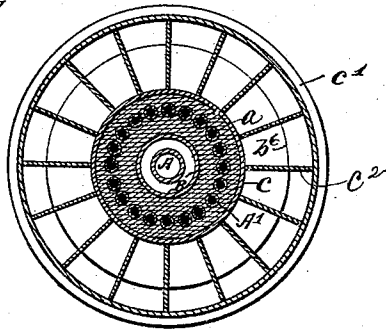
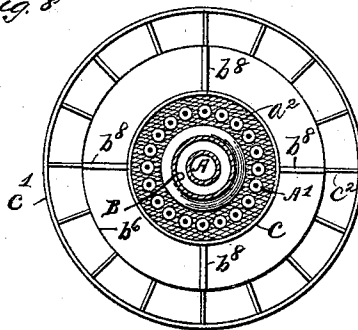


Fig 8



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Inventor
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UNITED STATES PATENT OFFICE.

THOMAS THORP, OF WHITEFIELD, ENGLAND.

REGENERATIVE GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 496,586, dated May 2, 1893.

Application filed September 3, 1892. Serial No. 444,958. (No model.) Patented in England in 1884, No. 962.

To all whom it may concern:

Be it known that I, THOMAS THORP, of Whitefield, county of Lancaster, England, have invented a certain new and useful Improvement in Regenerative Gas-Burners, of which the following is a specification, and for which I have obtained a British patent, No. 962, of 1884.

I will describe a gas burner embodying my improvement and then point out the novel features in the claims.

In the accompanying drawings Figure 1 is a sectional elevation of a burner embodying my invention. Fig. 2 is a sectional elevation of a regenerative burner, embodying my invention, the air under pressure being supplied directly into the body of the regenerator. Fig. 3 is a half plan view, partly in section, on the line 3, 3, Fig. 2 looking downward and a half plan looking upward from below the burner. Fig. 4 is a vertical section of a burner fitted with a regenerator to which air under pressure is supplied. Fig. 5 shows a half plan, partly in section, on the line 5, 5 of Fig. 4, looking downward, and a half plan looking upward from below the burner. Fig. 6 is a vertical section of a burner embodying my invention. Fig. 7 is a horizontal section on the line 7, 7 of Fig. 6. Fig. 8 is a bottom plan view thereof. Fig. 9 is a sectional elevation of an Argand burner having my invention applied. Fig. 10 is a half plan, partly in section on the line 10, 10, of Fig. 9, looking downward, and a half plan looking upward from below the burner.

Referring by letter to the drawings A designates a gas supply pipe to the end of which a burner A' is attached. The burner may consist of an annular series of vertically arranged pipes a discharging into an annular chamber a' provided with a number of nipples a^2 as shown in Fig. 2 or the gas may discharge directly into a chamber a^3 provided with nipples a^2 as shown in Figs. 1 and 4 or there may be an annular chamber a^4 provided with nipples a^2 similar to the ordinary Argand burner as shown in Fig. 9.

B is a casing surrounding the pipe A adjacent the burner and having a greater diameter than the pipe A so that there is an air space a^5 between said pipe and the casing. Air under pressure slightly exceeding that of

the atmosphere is introduced into this space a^5 by any desired means. The space a^5 communicates with a regenerator surrounding the burner. In Fig. 1 the regenerator consists of a shell B' surrounding the burner and having an annular horizontal partition of perforated material b near its upper portion through which air is forced to an exit near the burner tips.

In Fig. 2, the upper ends of the tubes a are shown as engaged in holes in a plate b' which serves as a bottom to the gas chamber d , into which the pipe A directly discharges. This plate b' may be integral with the wall of the chamber d . The regenerator is shown in this example as comprising a chamber formed by a shell b' surrounding the burner. An annular series of uptake tubes b^2 is arranged between the shell b' and the body of the burner. At the upper and lower ends the space between these tubes b^2 is closed in by suitable walls which may be integral with the tubes b^2 . In this construction the air is forced from the space a^5 between the several tubes b^2 and out through the annular opening b^3 where it mingles with the ignited gas, and a portion of air also passes between the pipes a to the inner side of the flame. A deflector b^6 attached to a portion depending from the tubes b^2 serves to spread the flame and direct it upward through the tubes b^2 .

In Fig. 4 the regenerator consists of the casing c surrounding the burner, the casing c' surrounding the casing c , and the transverse vertical partitions c^2 forming a series of chambers open at the top and bottom as plainly shown in Fig. 5. The inner ends of the partitions c^2 are secured to the casing c and other partitions c^6 extend from the inner side of the casing c to the burner which serves as a support. Air under pressure is forced into the chambers within the casing c by means of an injector c^3 forcing atmospheric air through a pipe c^4 which receives its air through the ports c^5 adjacent the injector.

In Fig. 6 the gas passes upward through the pipe A into a gas chamber d communicating with the annular row of tubes or pipes a which have the nipples a^2 at the lower end. An air space a^5 , formed by a casing B, as heretofore described surrounds the pipe A and has an opening at its upper end through

which the air passes and is deflected downward, by a deflector d' , which may be integral with the wall of the gas chamber d , into the space between the casing B and the casing c surrounding it and between the tubes a to the burner tips. The burner is surrounded by casings c c' , having the partitions c^2 , similar to the example shown in Fig. 4. The chambers formed by the partitions c^2 between the casings c c' serve as uptakes. The tubes a serve as conduits for the descending gas, and the casing c forms a conduit for the descending air supply. The example shown in Fig. 6, also has a flame deflector b^6 , supported by the casing c , which serves to spread the flame toward the uptakes. The deflector may be strengthened by ribs b^8 .

The regenerator shown in Fig. 9 is similar to that shown in Fig. 4, but showing an injector communicating with an air space a^5 similar to that shown in Figs. 1 and 2.

In all the examples of my improvement there is a supply of air, under pressure, to the casings surrounding the burner for combustion with the gas.

In all cases there is a downwardly extending flame, and in Fig. 6 I have shown an ascending gas supply and an ascending air supply.

By my invention I obviate the use of chimneys or globes.

Having described my invention, what I claim is—

1. In a regenerative gas burner, the combination with a burner for producing a downwardly or outwardly extending gas flame, a gas conduit communicating therewith, an air conduit surrounding the gas conduit means for supplying air under pressure and an annular series of uptakes surrounding the burner, substantially as specified.

2. The combination with a burner for pro-

ducing a downwardly or outwardly extending gas flame, of an ascending and descending gas supply conduit and an ascending and descending air supply conduit, substantially as specified.

3. The combination with a burner having a downwardly or outwardly extending gas flame, of an ascending and descending gas supply conduit, and an ascending and descending air supply conduit surrounding the gas supply conduit, substantially as specified.

4. The combination with an annular burner having a downwardly or outwardly extending flame, of an ascending gas supply conduit within the burner, an ascending air supply conduit surrounding the gas supply conduit within the burner, and a descending air conduit surrounding the burner, substantially as specified.

5. The combination with an annular burner having a downwardly or outwardly extending flame, of an ascending gas supply conduit within the burner, an ascending air supply conduit surrounding the gas supply conduit within the burner, a descending air conduit surrounding the burner, and an annular series of uptakes surrounding the said descending air conduit, substantially as specified.

6. The combination with a burner for producing a downwardly or outwardly extending gas flame, of a gas supply conduit and an ascending and descending air supply conduit substantially as specified.

In testimony whereof I have hereunto subscribed my name this 18th day of August, A. D. 1892.

THOMAS THORP.

Witnesses:

PETER J. LIVSEY,
WILLIAM FAULKNER.