

I. F. ZIMMERMAN.
BURNER.
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908,636.

Patented Jan. 5, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

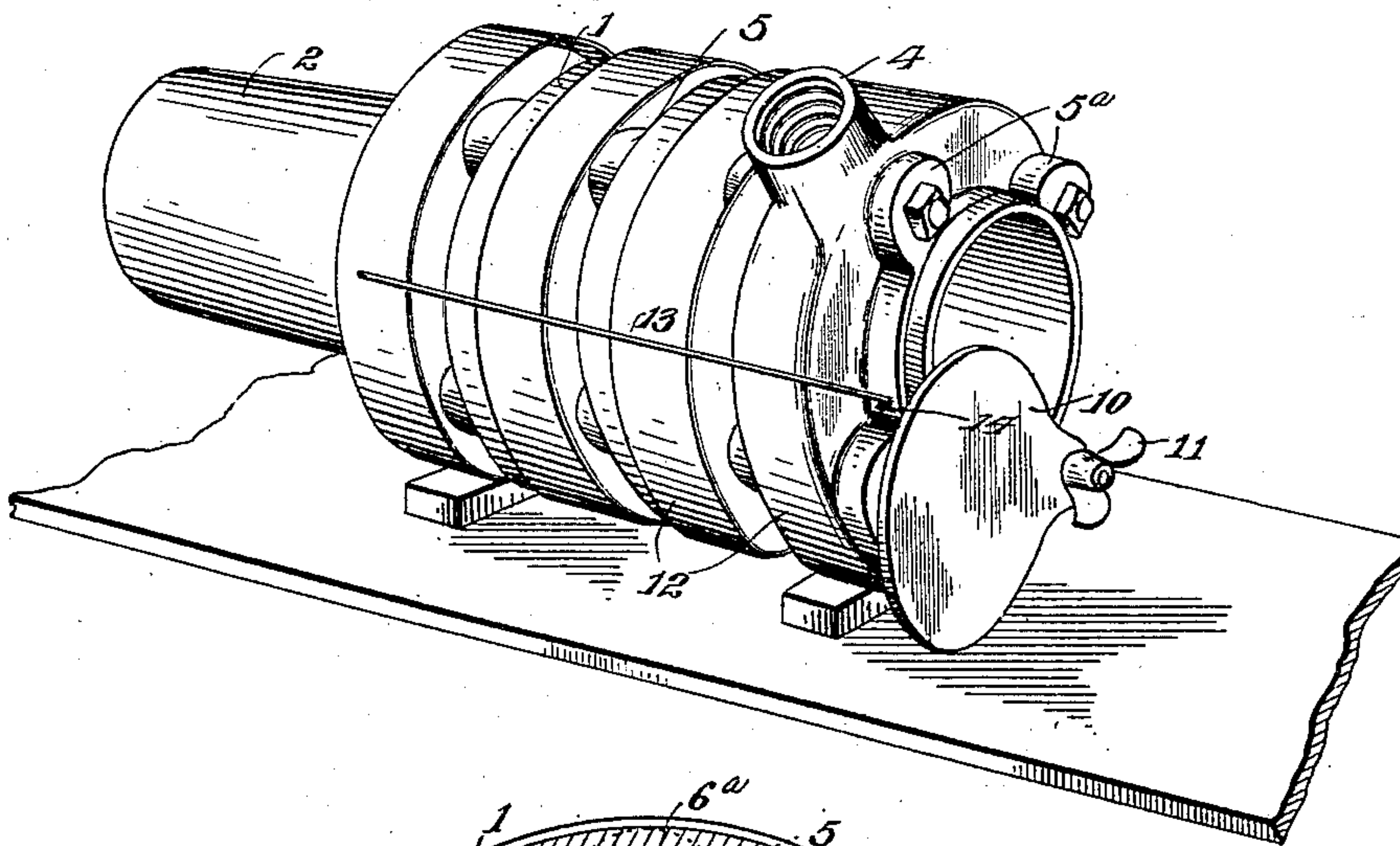
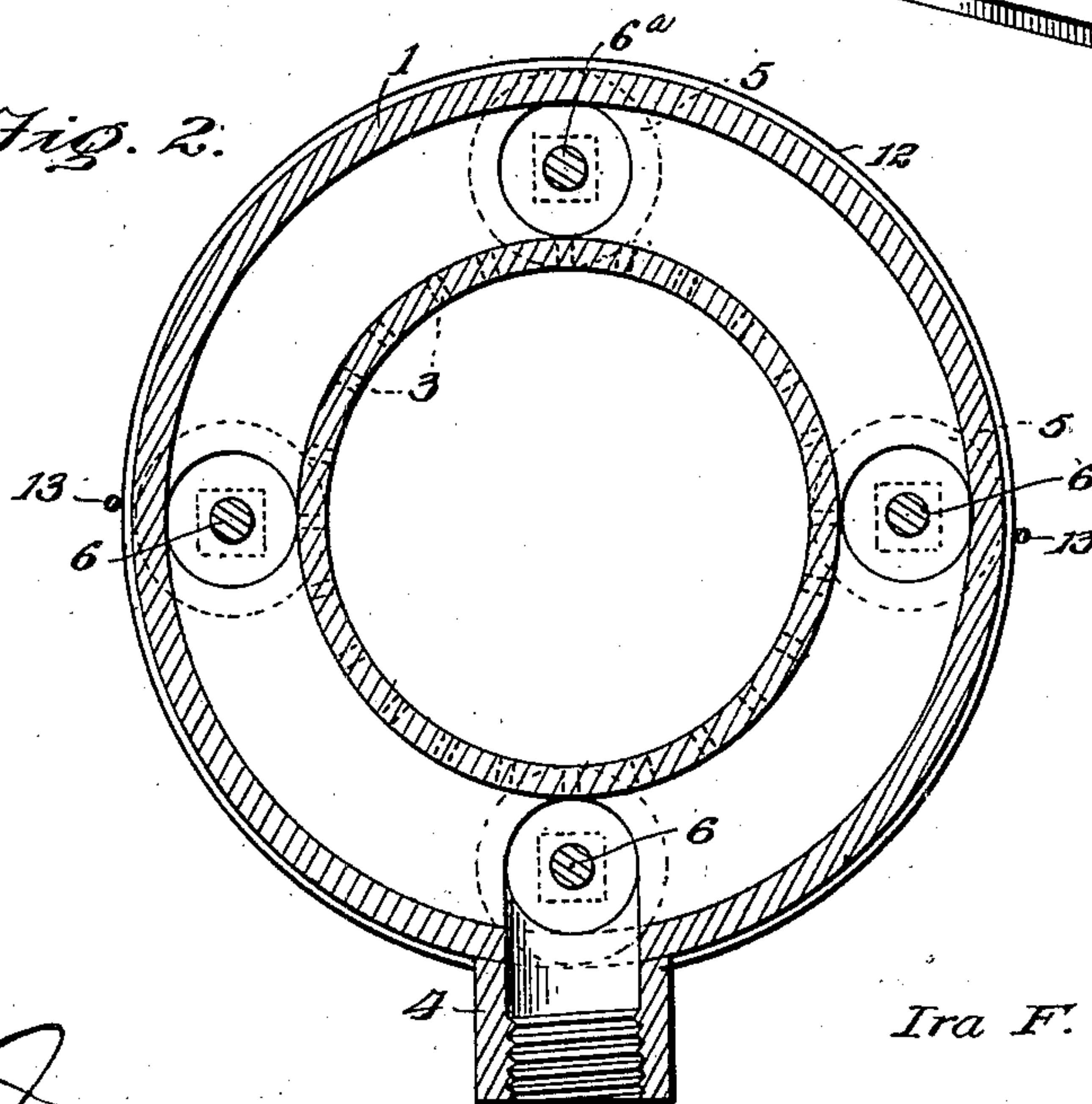


Fig. 2.



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UNITED STATES PATENT OFFICE.

IRA F. ZIMMERMAN, OF COFFEYVILLE, KANSAS.

BURNER.

No. 908,636.

Specification of Letters Patent.

Patented Jan. 5, 1909.

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To all whom it may concern:

Be it known that I, IRA F. ZIMMERMAN, citizen of the United States, residing at Coffeyville, in the county of Montgomery and State of Kansas, have invented certain new and useful Improvements in Burners, of which the following is a specification.

The present invention relates to certain new and useful improvements in heating appliances and more particularly to that type which are designed for use in connection with gaseous fuel.

The primary object of the invention is to design a simple and inexpensive burner in which the air and gas are caused to thoroughly mix with each other previous to combustion, thereby enabling a maximum amount of heat energy to be obtained from the gas.

The invention further contemplates a novel attachment for the burner whereby a forced draft can be applied to the same, should such a draft be required by the circumstances under which the burner is being utilized.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a perspective view of a burner embodying the invention. Fig. 2 is an enlarged transverse sectional view through the same. Fig. 3 is a longitudinal sectional view through the burner showing the same as employed in connection with a casing which is applied thereto when it is desired to use a forced draft.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In general the burner comprises a plurality of hollow sections encircling a central space and provided with ports through which a gaseous fuel can be discharged into the said central space, a nozzle being located at one end of the hollow sections and the said hollow sections being spaced from each other to admit of air being sucked into the burner between the same. These hollow sections encircling the central space in the burner may either be integral with each other and given a spiral formation, the various convolutions of which are spaced, or

the said hollow sections may be constructed independently of each other and given an annular formation. In the present instance this latter method is employed, and the various hollow sections 1 are shown as circular in shape and as placed side by side so as to inclose a cylindrical chamber. It will be readily apparent that these annular sections 1 may be either square, round, or of any other desired shape, and that they may be given any preferable cross section, a square or rectangular cross section being shown upon the drawings for purposes of illustration. A nozzle 2 is located at one end of the annular sections 1 and it will be observed that the interior of the said nozzle has a conical formation and tapers toward the extremity thereof. The gaseous fuel is admitted to the various annular sections 1 of the burner and is discharged into the space within the annular sections through the ports 3, an annular row of the said ports being provided in the inner face of each of the sections 1 at the end thereof toward the nozzle 2, and the said ports being inclined with respect to the longitudinal axis of the burner so as to direct the gaseous fuel in a plurality of jets leading from the center of the burner at an angle to the axis thereof. These jets of the gaseous fuel operate to produce suction drawing air into the interior of the burner between the various annular sections 1, the said air commingling with the gas during its passage through the burner and nozzle and becoming thoroughly mixed therewith previous to combustion. In the present instance the annular section 1 most remote from the nozzle 2 is provided with an inlet 4 communicating with a supply pipe for delivering gaseous fuel thereto, and the various annular sections are in communication with each other and receive gas from the said section provided with the inlet. The annular sections 1 are cast with bosses 5 projecting from opposite sides thereof and surrounding corresponding openings, the extremities of the said bosses being carefully machined so that when the sections are placed together the ends of the corresponding bosses will produce a close joint and passages will be formed connecting the hollow interior of the sections. The inner face of each of the end sections 1 is also formed with a plurality of the bosses 5, while the bosses 5^a upon the outer faces of the end sections have the end portions there-

of closed and drilled with suitable openings to receive tie rods or bolts 6 extending through the various sections 1 and operating to clamp the same securely together. One
 5 of these tie rods or bolts 6^a has both ends thereof threaded, and the several bolts after extending through the various annular sections 1 also engage an annular rim 7 upon the inner end of the nozzle 2, nuts or similar
 10 members 8 being interposed between the rim 7 and the said sections 1 to retain the said members in a spaced relation and the extremities of the bolts being capped by nuts 9 which retain the nozzle in position. It
 15 will thus be apparent that an air inlet space similar to that between the adjacent sections 1 is also provided between the end section 1 and the nozzle. The opposite end of the burner to that having the nozzle applied
 20 thereto is provided with a swinging plate 10 designed to open or close the same as may be required. This swinging plate is hinged upon the before mentioned bolt or tie member 6^a having both ends thereof threaded,
 25 and a thumb nut 11 threaded upon the said bolt operates to lock the plate in an adjusted position. It may also be mentioned that the plate 10 furnishes a means for lighting the burner, enables an excess of air to be supplied to the burner when forcing the same,
 30 and can be closed tightly to prevent cold air entering the furnace when the burner is not in operation.

A damper device is utilized for controlling
 35 the admission of air into the burner through the spaces between the annular sections 1 thereof, and this damper device comprises a plurality of bands 12 arranged upon the exterior of the burner so as to slide longitudinally thereon, one of these bands being
 40 provided for each of the annular sections and the space between the end section and the nozzle. These various bands 12 are connected by the strips 13, the ends of the strips
 45 terminating in finger pieces 14 enabling the various bands to be moved simultaneously. With this construction it will be readily apparent that the effective size of the air inlets can be controlled to regulate the admission
 50 of air and that when the burner is not in operation the bands can be moved so as to entirely close the air inlets.

In the operation of the burner the gaseous fuel is supplied to the end section 1 through
 55 the inlet opening 4 and passes from this section to the other sections through the passages formed by the bosses 5. From these various sections the gas is discharged in a plurality of jets through the outlet openings
 60 or ports 3, the said jets being disposed at an angle to the longitudinal axis of the burner and operating to draw air into the burner through the spaces between the annular sections, the quantity of the air thus supplied
 65 being regulated by the damper device. The

air and gas thus entering the burner are thoroughly commingled and mixed during their passage through the same and the nozzle so as to produce perfect combustion within the furnace.

Under certain conditions it may be found
 70 desirable to apply a forced draft to the burner and for this purpose a detachable casing 15 may be applied thereto, the said casing completely surrounding the burner
 75 with the exception of the nozzle, and one end thereof being designed to abut against an annular flange 16 upon the nozzle while the opposite end is formed with a tubular
 80 projection 17 arranged in alinement with the opening through the burner. This tubular member 17 is designed to receive a forced draft from any suitable source and serves to direct the same into the interior of the
 85 burner, the intensity of the draft being designed to be regulated by a blast gate 18 at the mouth of the tubular projection 17 and also by the swinging plate 10. The ends of this casing 15 are provided with openings 19
 90 to receive the strips 13 by means of which the bands 12 are controlled. It will also be observed that an opening 20 is formed in one side of the casing 15 to receive a handle
 95 for swinging the plate 10 when necessary. It is to be noted that this casing 15 is detachable and that the burner can be employed either with or without the same, the said casing being only utilized when a forced draft is necessary.

It will be observed that the nozzle 2 is
 100 provided at a point toward the base thereof with a port 21 arranged at an angle to the axis of the nozzle and communicating with a nipple 22 to which a steam pipe can be applied should it be desired to produce a
 105 forced draft within the nozzle by means of steam.

Having thus described the invention, what is claimed as new is:

1. A burner comprising a plurality of
 110 spaced annular sections encircling a central space, each of the sections being hollow and inclosing an independent annular chamber, and the said sections being provided upon their adjacent faces with corresponding
 115 bosses which cooperate with each other to form passages establishing communication between the sections, and means for holding the sections together, the sections being provided upon their inner sides with jet openings which lead from the annular chambers to the central space encircled by the annular sections.
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2. A burner comprising a plurality of
 125 spaced annular sections encircling a central space, each of the sections being hollow and inclosing an independent annular chamber and the sections being provided upon their adjacent faces with corresponding bosses cooperating with each other to form passages
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establishing communication between the sections, and tie rods extending through the bosses and engaging the end sections to hold the various sections together, the said sections being provided upon their inner sides with jet openings leading from the annular chambers to the central space encircled by the annular sections.

3. A burner comprising a plurality of spaced annular sections encircling a central space, each of the sections being hollow and inclosing an independent annular chamber and the said sections being provided upon their adjacent faces with corresponding bosses coöperating with each other to establish communication between the chambers, means for controlling the effective size of the air openings between the sections, and a nozzle at one end of the sections, the said sections being provided upon their inner sides with jet openings which lead from the annular chambers to the central space encircled by the annular sections.

4. A burner comprising a plurality of spaced annular sections encircling a central space, each of the sections being hollow and inclosing an independent annular chamber and the said sections being provided upon their adjacent faces with corresponding bosses coöperating with each other to establish communication between the chambers, bands movably mounted upon the sections for controlling the effective size of the air openings between the sections, and a nozzle at one end of the sections, the said sections being provided upon their inner sides with jet openings which lead from the annular chambers to the central space encircled by the annular sections.

5. A burner comprising a plurality of spaced annular sections encircling a central space, each of the sections being hollow and

inclosing an independent annular chamber, the said sections being provided upon their inner sides with jet openings leading from the annular chambers to the central space encircled by the annular sections, a nozzle at one end of the burner, and a removable casing adapted to inclose the burner for the purpose of applying a forced draft thereto.

6. A burner comprising a plurality of spaced annular sections encircling a central space, each of the sections being hollow and inclosing an independent annular chamber, the said sections being provided upon their inner sides with jet openings leading from the annular chambers to the central space encircled by the annular sections, a nozzle at one end of the burner, and a removable casing adapted to inclose the burner and to abut against the base of the nozzle for the purpose of applying a forced draft to the burner.

7. A burner comprising a plurality of spaced annular sections encircling a central space, each of the sections being hollow and inclosing an independent annular chamber, the said sections being provided upon their inner sides with jet openings leading from the annular chambers to the central space encircled by the annular sections, a nozzle at one end of the burner, and a removable casing adapted to inclose the burner and abut against the base of the nozzle for the purpose of enabling a forced draft to be applied to the burner, the said casing being formed with a tubular projection in alinement with the central space of the burner.

In testimony whereof I affix my signature in presence of two witnesses.

IRA F. ZIMMERMAN. [L. s.]

Witnesses:

E. S. REA,
W. M. CASEY.