(No Model.)

W. L. MITCHELL.

GAS BURNER.

No. 492,041. Patented Feb. 21, 1893.

Fig. 1.

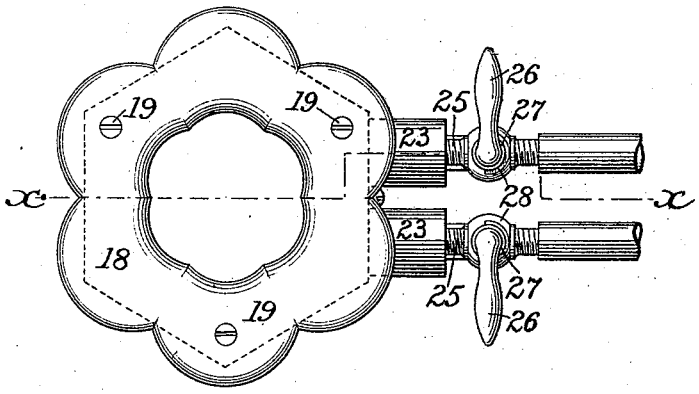


Fig. 2.

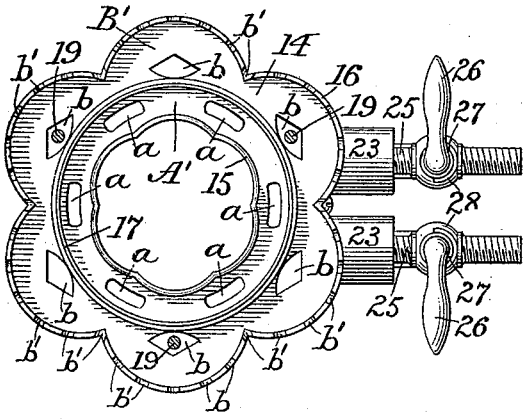


Fig. 3.

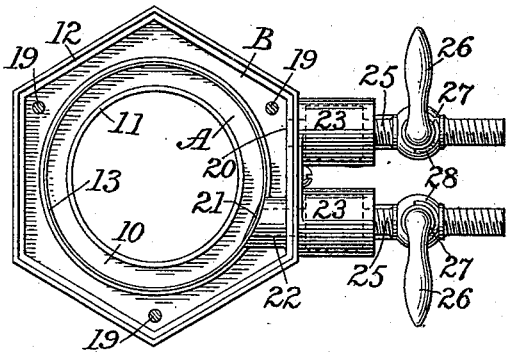


Fig. 4.

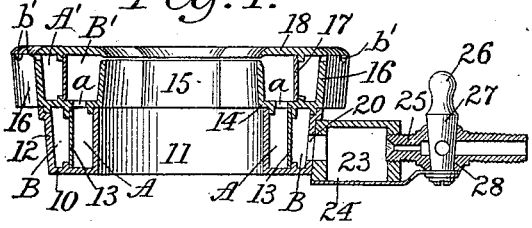
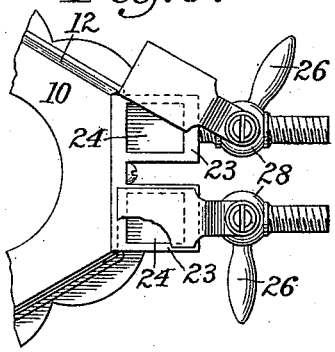


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILIAM L. MITCHELL, OF NEW YORK, N. Y.

GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 492,041, dated February 21, 1893.

Application filed February 15, 1892. Serial No. 421,543. (No model.)

To all whom it may concern:

Be it known that I, WILIAM L. MITCHELL, of New York, in the county and State of New York, have invented certain new and useful Improvements in Gas-Burners; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, making a part of this specification.

My invention relates particularly to burners which are designed for domestic and other similar purposes, but some of the features are applicable to other styles of burners as will appear hereinafter.

The objects of the invention are to secure a more thorough and uniform mixing of the gas and air before combustion, to make the pressure on the mixture uniform upon all parts of the burner, to enable the amount of flame to be regulated easily to any desired degree between the extremes, and generally to improve the construction.

In the drawings: Figure 1 is a plan view of a convenient form of my improved burner: Fig. 2 is a plan view of the same with the top plate removed: Fig. 3 is a plan view of the same with the entire upper section removed: Fig. 4 is a vertical section on the line x—x of Fig. 1: Fig. 5 is a bottom view of a portion of the burner.

In general form the burner is annular and is adapted to produce a flame on the inner periphery of the annulus and an independent flame on the outer periphery. The two flames are fed independently and when the minimum of heat is desired the supply of gas is cut off entirely from the outer flame or burner and the inner flame or burner is turned to its lowest point. With both flames or burners under the full pressure the maximum heat is obtained. Between these extremes it is obvious that any desired degree of heat may be obtained. It is for this reason that the general shape of the burner is preferably annular and I shall hereinafter employ the term annular in a general sense although the outlines of the inner and outer peripheries of the annulus may vary very much from a true circle in order to give the flame that form which is found productive of the best results.

The bottom plate 10 has erected thereon inner and outer walls 11 and 12 and an intermediate wall or partition 13, thereby forming two independent chambers A and B. The chambers are covered by a second annular plate 14 which fits exactly upon the upper edges of the walls 11, 12 and 13 and is provided with a row of perforations a, a, which communicate only with the inner chamber A, and with a second row of perforations b, b, which communicate only with the outer chamber B. Upon this second plate 14 are erected inner and outer walls 15, 16 and an intermediate wall or partition 17 which separates the two series of perforations a, a, and b, b, and forms within the upper portion of the burner two independent chambers A′ and B′. A plate 18 rests closely upon the upper edge of the wall 17 and may be held thereon by bolts 19, 19, which serve to bind all the parts firmly together.

Near the top of each chamber A′, B′, is formed the combustion orifice or opening for the exit of the mingled gas and air. The exact form of this opening is immaterial but I have shown the opening from the chamber A′ as a narrow slit between the upper edge of the wall 15 and the inner edge of the annular plate 18 and adapted to produce a solid flame, and I have shown a series of openings b', b', formed in the upper edge of the outer wall 16 and adapted to produce a jet flame. As before stated the two flames or burners are fed independently. For this reason the chamber B is provided with a port 20 and the chamber A′ is provided with a separate port 21. These ports are formed in the lateral walls of the respective chambers and a tube 22 is passed through the wall 12 and through the chamber B to conduct the gas to the port in the partition wall 13. I prefer to provide for each port 20, 21, a separate injector chamber 23. One chamber communicates directly with the outer chamber B, and the other, through the tube 22, with the inner chamber A. Each chamber is formed with an air receiver or opening 24 and is fitted to receive the end of the gas tube 25 in alignment with the port 20 or 21. The interior diameter of the gas tube is reduced as shown in Fig. 4, to form an injection nozzle through which the gas flows as a jet directed into its opposite port 20 or 21 and draws with it the proper amount of air

through the air port 24. The area of the nozzle is so proportioned relatively to the area of the air opening and to the pressure of the gas that the proper relative volumes of gas and air shall enter the mixing chamber together.

I prefer to provide a valve for the gas supply and a valve for the air supply and to connect them together so that as the gas valve is moved to reduce the supply of gas the air valve shall be moved to a corresponding degree to reduce the volume of air admitted.

In the drawings I have shown the gas valve as an ordinary stop cock having a handle 26, a core 27 and a seat 28 therefor, the core being perforated to permit the passage of gas when turned to bring the perforation in alignment with the axis of the tube, and I have shown the air valve as an ordinary gate secured to the core of the gas cock and adapted to be moved over the air receiver or opening 24 as the core is rotated to open or close the passage of the gas.

In the operation of my improved burner the jet of gas, as it enters the port in the lateral wall of the mixing chamber A or B, carries with it a current of air and as the mingled current of gas and air impinges upon the opposing wall of the mixing chamber it is deflected and divided and traverses the full extent of the chamber, the gas and air becoming more or less intimately mixed. If the combustion orifice were formed directly in the walls of this chamber A or B not only would the combustion take place before the gas and air were mixed as much as desirable but the pressure would vary very much at different distances from the port with the result that the flame would not be uniform at different points about the periphery of the burner. In order therefore that the air and gas may become more thoroughly mixed and that the flame may be uniform at all points I have interposed between the mixing chamber and the combustion orifice, an equalizing chamber A′ or B′ which is coextensive with the mixing chamber and is separated therefrom by the perforated plate. The result of the interposition of the perforted plate and the equalizing chamber is to produce a more intimate mixture of the air and gas and reduce the effect of the inflowing jet of gas to such an extent as to make a pressure in the equalizing chamber substantially uniform at all points.

It will be observed that by the formation of the port for the outer mixing chamber directly in the lateral wall of said chamber, and by introducing the gas into the inner chamber through a tube which passes through the outer chamber into the lateral wall of the inner chamber, I not only reduce the cost of construction on account of the greater simplicity of the mold for the casting of the lower chambers, but I thereby direct the inflowing current of gas against an opposing convex wall which materially assists in effecting a uniform distribution of the gas. Heretofore, in double annular burners, the gas has been introduced through the bottom of the chamber with the result that the gas is unequally distributed.

I claim as my invention—

1. In a gas burner, the combination of an annular plate having lateral walls erected thereon, a second plate fixed upon said walls and forming therewith an annular mixing chamber, said second plate being perforated at intervals throughout its extent, and lateral walls and a top plate above said second plate forming an annular equalizing chamber coextensive with the mixing chamber, said equalizing chamber having a combustion orifice, whereby the gas is thoroughly mixed and uniformly distributed to all parts of the combustion orifice, substantially as shown and described.

2. In a gas burner, the combination of an outer annular chamber communicating with a combustion orifice, an inner annular chamber communicating with an independent orifice, said first named chamber having in its outer wall a port for the admission of air and gas, and a pipe passed through the said first named chamber and communicating with the inner chamber for the admission of air and gas thereto, whereby the inflowing currents of gas are directed against opposing convex walls and the gas is thereby distributed, substantially as shown and described.

3. In a gas burner, the combination of an annular plate having inner and outer walls and an intermediate wall forming two independent chambers, a plate fixed upon the upper edges of said walls and having two series of perforations communicating respectively with said chambers, inner and outer and intermediate walls erected upon said plate and forming two independent chambers corresponding to the first named chambers, and a top plate to cover said last named chamber, said last named chambers having independent combustion orifices, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILIAM L. MITCHELL.

Witnesses:
A. N. JESBERA,
A. WIDDER.