Sept. 13, 1927. 1,642,153

W. W. KEMP

GAS BURNER

Filed March 13, 1925 2 Sheets-Sheet 1

Fig. 1

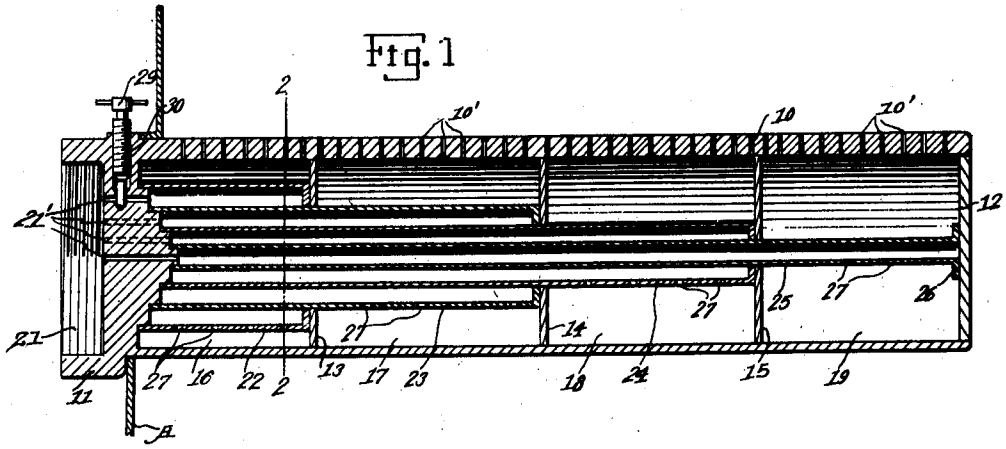


Fig. 3.

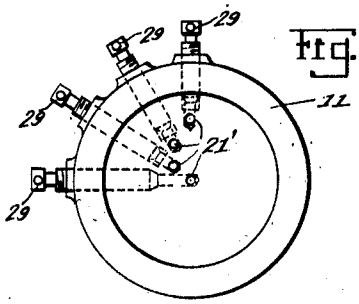


Fig. 2.

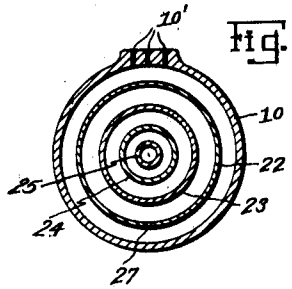


Fig. 4.

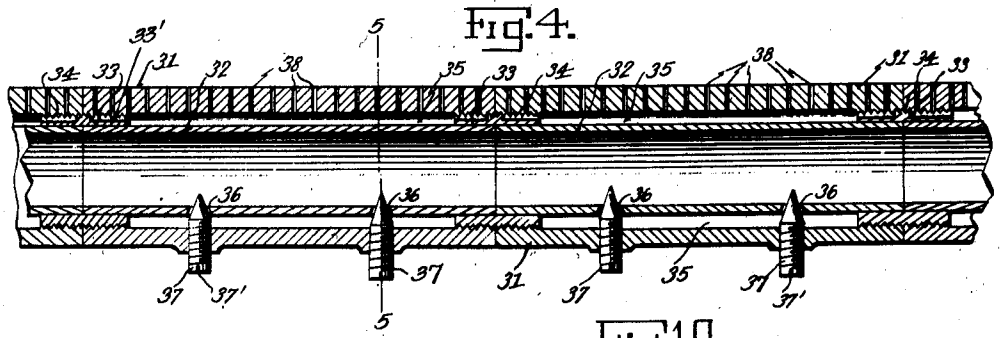
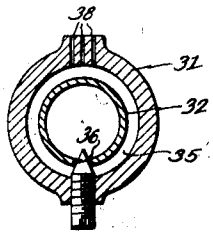


Fig. 10.



Fig. 5.



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Fig. 6.

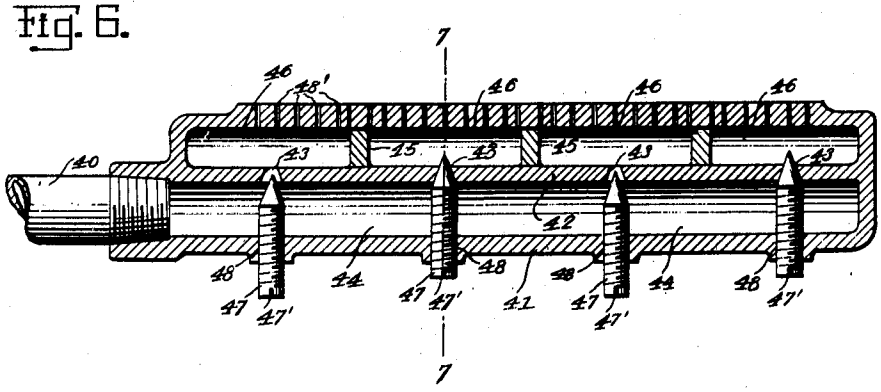


Fig. 7.

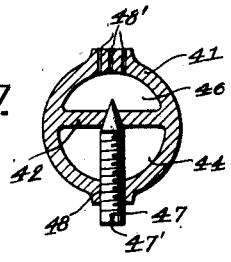
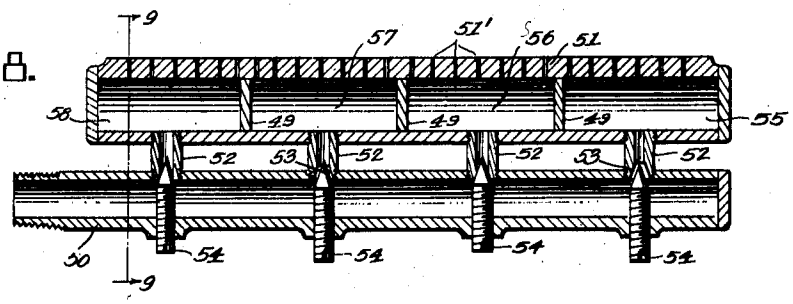


Fig. 8.



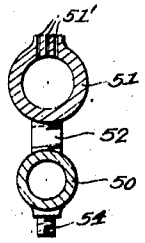


Fig. 9.

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Patented Sept. 13, 1927. 1,642,153

UNITED STATES PATENT OFFICE.

WILLIAM WALLACE KEMP, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE C. M. KEMP MANUFACTURING COMPANY, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

GAS BURNER.

Application filed March 13, 1925. Serial No. 15,315.

This invention relates to gas burners, and more particularly to burners especially adapted for use in connection with baking ovens, although not limited to this special use.

An object of the invention is to provide a construction whereby the volume of fuel and air mixture admitted to the several burner jet openings of the burner may be independently controlled.

Another object is to provide a burner with control means outside of the oven for regulating the fuel to the several sections of the burner, whereby the heat from one or more sections may be varied without disturbing the other sections.

Another object of the invention is to provide a burner construction consisting of a plurality of substantially concentrically arranged tubes leading from a common fuel manifold to separate fuel spaces or burner compartments, the burner having independently adjustable means for regulating the amount of fuel admitted to each compartment.

A further object is to provide a burner which is simple and compact in structure and will occupy a minimum amount of space. Certain detail features of the invention herewith shown and described but not specifically claimed, are embodied in copending application Serial No. 160,908, filed January 13, 1927.

The above and other objects of the invention will be more clearly set forth in connection with the description of the embodiments of the invention illustrated in the accompanying drawings, in which:

Figure 1 is a longitudinal section through one form of improved burner.

Figure 2 is a section taken on line 2—2 of Figure 1.

Figure 3 is an end view looking toward the right in Figure 1.

Figure 4 is a longitudinal section through a slightly modified form of burner.

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a longitudinal sectional view of another form of burner.

Figure 7 is a cross section taken on the line 7—7 of Figure 6.

Figure 8 is a central longitudinal section through a different form of burner.

Figure 9 is a cross section taken on the line 9—9 of Figure 8, and

Figure 10 is an enlarged detail of the sleeve illustrated in Figure 4.

Referring to Figures 1, 2 and 3, 10 indicates an elongated casing, formed with jet openings 10′, the casing having an integral head 11 at its inlet end and a head 12 at its opposite end. A series of apertured discs 13, 14 and 15 are disposed within the tube 10 and form partitions, providing a plurality of longitudinally arranged fuel chambers 16, 17, 18 and 19.

The head 11 is recessed to form a fuel manifold chamber 21 adapted to receive fuel from a supply pipe (not shown), which may be threaded thereinto. The opposite or inner face of the head is stepped, each said stepped portion having an orifice or fuel passage 21′ extending therethrough, which communicates with concentrically arranged, longitudinally extending tubes 22, 23, 24 and 25, each of a different length. The central tube 25 is supported at one end by the center circular projection on the inner face of head 11, the opposite end being flanged, as at 26, which flange rests against the head 12. Each of the shorter tubes is supported at one end by a portion of the stepped face of the head with its opposite end supported by a partition wall or disk 13, 14 and 15 respectively. The partitions serve the dual function of supporting the several tubes, and of dividing the burner into separate chambers. Each tube is provided adjacent its end, which is exposed within a chamber, with a series of discharge orifices 27; these serve as outlets for the fuel from the several tubes direct to the respective surrounding chambers, from which it escapes through jet orifices arranged in a line along the top of the outer tube 10. It will be noted that the discharge openings 27 are located so as to direct the fuel downwardly or away from the jet openings 10′ so that it must travel a considerable distance through the chambers before issuing therefrom. In this form of the invention, the volume of fuel and air mixture is projected from the tubes to substantially the base of each chamber, and

must reverse its direction to reach the burner openings; thus insuring a thorough distribution of the volume of the mixture.

Independent control and regulating valves 29 exteriorly threaded and mounted in threaded openings 30 formed in the head 11, one for each tube and its respective chamber, serve to independently control the volume of fuel and air mixture admitted to the tubes and chambers through the passages 21, so as to vary the flame on some sections without disturbing other sections.

It will be noted in Figure 1, that the burner shown therein is supported in an opening formed in the wall A of an oven and that the burner sections and the head 12 are within the oven, whereas the control valves 29 carried by the head 11 are outside of the oven. By arranging the burner in this manner, with the control valves outside of the oven, such valves are accessible at all times, and by manipulating them, the heat on one or more of the burner sections may be varied without disturbing other sections. This is particularly desirable in the conveyor type of oven which requires more heat at some sections than at others.

In the form of the burner illustrated in Figures 4 and 5, 31 indicates an outer cylindrical casing, within which casing is disposed, substantially concentrically, an inner fuel manifold tube 32. The casing and manifold tube are made in sections united at intervals throughout their length, and between the sections there is provided an exteriorly threaded sleeve or thimble 33, having longitudinal slots 33′ extending inwardly from each end to a point adjacent the center of the sleeve. The threads of the sleeve 33 co-operate with internal threads 34 formed at the end of each section of the casings 31 to unite the casing sections. It will be seen that, by reason of the provision of slots 33′, the volume of fuel and air mixture is enabled to reach and be emitted from the burner jets 38 adjacent the meeting ends of each section of the cylindrical casing 31. With such an arrangement of parts, it is possible to distribute the fuel jets or openings 38 throughout the length of the various sections of the burner. The sleeves serve as partitions, thereby dividing the space between the manifold and casing into burner chambers 35; and also function to maintain the manifold tube sections, having abutting ends, properly spaced from the casing wall.

Gas is admitted to the manifold tube 32 from any suitable supply, (not shown) arranged to connect with either end of the tube structure, and passes from this tube, through orifices 36 to the cylindrical chambers 35. The amount of fuel passing through orifices 35 is controlled by independently operable needle valves 37, screw-threaded into the under side of the outer casing 37, each valve having a slot 37′ in its base for actuating it. The valves function in precisely the same manner as the valves 29 illustrated in Figures 1 and 3.

Referring to Figures 6 and 7, 40 indicates a pipe into and through which gas is conducted to the burner casing 41, which burner is, preferably, in the form of a substantially cylindrical tube. A horizontal partition wall 42 having spaced orifices 43 therethrough, divides the burner into a lower fuel manifold chamber 44 and upper burner chamber which is sub-divided by transverse partitions 45 into burner chambers 46, the said wall extending longitudinally throughout the length of the burner. Needle valves, in the form of cylindrical plugs 47, exteriorly screw threaded, are adjustably mounted in screw threaded openings 48 formed in the wall of the burner, and extend across the fuel chamber 44 into the orifices 43 to regulate and control the passage of fuel from the fuel chamber to the upper burner chambers. Each valve member is provided in its base with a slot 47′ adapted to receive a screw driver or similar tool for adjusting it with respect to its seat formed by the orifice 43 in the partition wall 42. Formed in the burner top are jet openings 48′. These openings are disposed at intervals throughout the length of the burner.

Gas from the inlet pipe 40 passes into the fuel manifold 44, through the orifices to the upper burner chambers, from which it is emitted through the openings 48′ in the form of a highly intensified flame.

By the provision of adjustable valves 47, whose conical upper ends are adapted to seat in with the orifices 43, it is possible to regulate to a very fine degree the amount of fuel passing to the chambers 46 and openings 48.

In the modification shown in Figures 8 and 9, 50 indicates the main fuel supply manifold, 51 the burner tube, having jet openings 51′; and 52 short tubes or nipples connecting the manifold and the burner tube. The ends of the short tubes are screw threaded into the manifold and burner tubes, and each tube has formed in its lower end a conical seat 53. Threaded through the base of the manifold immediately below each short tube is a screw threaded needle valve 54 of the form employed in connection with the burners of Figures 4 to 7. Each tube 52 communicates with one of the chambers 55, 56, 57 and 58 which are formed in the burner tube by the provision of transverse partitions 49, arranged at intervals throughout the length of the tube.

In Figure 10, the particular form of exteriorly threaded connecting sleeve 33 is illustrated. This sleeve is provided at one

portion of its periphery with longitudinal slots 33′ extending inwardly from each end and terminating short of the center of the sleeve. The above described slots 31′ provide a fuel passage which communicates with the fuel openings 38 arranged adjacent the ends of each section of the outer cylindrical casing 31, thereby enabling the burner casing to be provided with a greater number of jet or fuel openings, such openings extending throughout the longitudinal length of each section to substantially the end thereof. By such an arrangement of fuel openings, the flame emitted from the various sections is substantially continuous. This is particularly desirable so that when the issuing gas is ignited at one end of the burner, the flame will flash entirely along the burner.

In all of the forms hereinbefore described, it will be seen that the mixture of gas and air is fed to each burner chamber having jet openings, from a common source of supply, such as a manifold, the means of communication between the manifold and the several chambers being variable. The preferable form, however, is that illustrated in Figures 1, 2 and 3, wherein the manifold is at one end of the casing and is connected with the several chambers by a series of concentric tubes extending longitudinally through the burner casing, and each having openings through which the fuel is introduced into each chamber, preferably in a direction away from its jet openings. A separate independently adjustable valve is provided in each instance for the purpose of regulating the amount of fuel mixture supplied to each burner. By the use of these independently controlled valves, it is possible to control the admission of fuel and air mixture to each chamber whereby the flame on some sections may be varied without disturbing the flame on other sections.

It is, of course, understood that it is within the spirit of the present invention to make various other changes or modifications in the above described constructions within the scope of the appended claims, and also that the burners illustrated in the drawings, while particularly adapted for use in connection with ovens for baking bread or cake, are not to be limited to this specific use, but may be employed in connection with ovens and stoves of various types, or put to any other use for which their particular constructions are adapted.

I claim:

1. A gas burner comprising an elongated casing provided with jet openings, a plurality of concentrically arranged tubes disposed within said casing and having orifices therein, a head at one end of the casing forming a manifold communicating with each tube, the said casing having partition walls therein forming independent burner chambers, the tubes delivering to independent chambers, and a series of adjustable valves for regulating independently the amount of fuel admitted to each tube.

2. A gas burner comprising an elongated casing provided with jet openings, a plurality of coaxially arranged tubes of progressively increasing lengths disposed within said casing and having orifices therein, a head at one end of the casing forming a manifold communicating with each tube, longitudinally spaced partition members mounted within the casing and forming separate chambers for each of the tubes, and a series of adjustable valves for regulating independently the amount of fuel admitted to each tube.

3. A gas burner comprising an elongated casing provided with jet openings, a plurality of concentrically arranged tubes disposed within said casing and having orifices therein, a head at one end of the casing forming a manifold communicating with each tube, the said casing having partition walls therein forming independent burner chambers, the tubes delivering to independent chambers, and a series of independently adjustable valves in said head for regulating the amount of fuel admitted to the tubes.

4. A gas burner formed of a plurality of concentrically arranged tubes of different lengths, a casing surrounding said tubes and having delivery orifices therein, spaced transverse partition walls within the casing forming independent burner chambers, a head at one end of the casing having orifices therethrough communicating with each of said tubes respectively, said tubes having openings communicating with independent chambers, and valves arranged within the head for controlling independently the amount of fuel mixture admitted to each of said tubes.

5. A gas burner comprising an elongated casing provided with jet openings, a head at one end of the casing having orifices therethrough, concentrically arranged tubes adapted to receive fuel through each of said orifices respectively positioned within the casing and having discharge openings therein, apertured plates within the casing engaging the tubes and forming separate burner compartments around the tubes, and valves in the head for controlling the amount of fuel mixture admitted to each tube, the openings in said tubes being arranged so that the tubes deliver to separate compartments.

6. A gas burner having an elongated casing provided with jet openings, a series of tubes extending longitudinally into the casing, a head for the casing having fuel passages therethrough adapted to communicate with each of said tubes respectively, trans-

verse partition walls arranged within the casing and forming a plurality of burner compartments, and a series of independently adjustable valves for regulating the amount of fuel mixture admitted to the tubes from said head, the tubes having discharge openings communicating with said compartments.

7. A gas burner comprising a casing provided with jet openings, a plurality of tubes extending into the casing, a head for the casing having a plurality of fuel passages therethrough adapted to communicate separately with each of said tubes respectively, the outer face of said head being recessed to form a fuel supply manifold, transverse partition walls arranged within the casing and forming a plurality of burner chambers, and a series of independently adjustable valves on said head for regulating the amount of fuel mixture admitted to the tubes, said tubes being concentrically arranged and having fuel discharge openings leading to separate chambers.

8. A gas burner having an elongated casing provided with jet openings, a series of tubes extending longitudinally into the casing, a head for the casing having fuel passages therethrough adapted to communicate with said tubes, transverse partition walls arranged within the casing and forming a plurality of burner compartments, and a series of independently adjustable valves for regulating the amount of fuel mixture admitted to the tubes from said head, the tubes having discharge openings communicating with said compartments, said discharge openings introducing the fuel into said compartments in a direction substantially opposite to that of the jet openings.

9. A gas burner comprising a casing provided with jet openings, a plurality of tubes extending into the casing, a head for the casing having a plurality of fuel passages therethrough adapted to communicate separately with each of said tubes, the outer face of said head being recessed to form a fuel supply manifold, transverse partition walls arranged within the casing and forming a plurality of burner chambers, and a series of independently adjustable valves on said head for regulating the amount of fuel mixture admitted to the tubes, said tubes being concentrically arranged and having fuel discharge openings leading to separate chambers.

10. A gas burner comprising a casing provided with jet openings, a plurality of concentric tubes of different lengths extending longitudinally within the casing and supported therefrom, a head for the casing having fuel passages therethrough, said head being recessed to form a fuel manifold and supporting an end of each tube, transverse partition walls arranged within the casing, said walls supporting the opposite end of each tube and forming independent burner chambers, and a series of independently adjustable valves in said head for regulating the amount of fuel mixture admitted to the tubes, said tubes having discharge orifices adjacent their ends leading to separate chambers.

11. A gas burner having a casing provided with jet openings, a plurality of concentric tubes of different lengths extending through the casing, a head for the casing forming a fuel manifold, said head supporting one end of each of said tubes and having fuel passages therethrough adapted to communicate with each of the tubes, transverse partition walls within the casing, said walls supporting an end of each of said tubes and forming separate burner compartments, and independently adjustable valves extending into said head to control the passage of fuel to each tube, each of the tubes having adjacent one end a portion exposed within a burner compartment and provided with openings for discharging fuel thereinto.

12. The combination with the wall of an oven, of a burner extending through and supported by said wall, said burner having flame orifices therein on one side of the wall, a plurality of tubes of different lengths mounted in said burner, partitions within the burner forming a series of separate chambers for each of said tubes, and means on the opposite side of the wall for independently controlling the supply of fuel to each of said chambers.

In testimony whereof I have hereunto set my hand.

WILLIAM WALLACE KEMP.