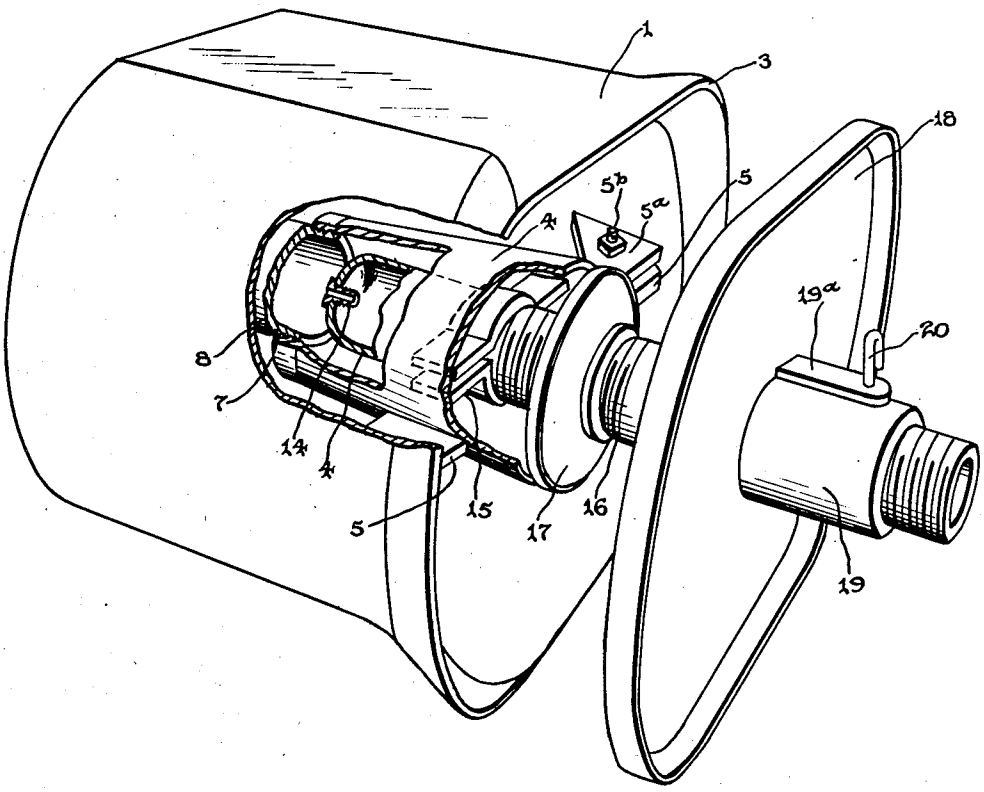
Oct. 6, 1931. J. S. ZINK 1,826,588

GAS BURNER

Filed April 10, 1930 2 Sheets-Sheet 1

Fig. 1.



Inventor
John S. Zink,

By George A. Prevost
Attorney

Oct. 6, 1931. J. S. ZINK 1,826,588

GAS BURNER

Filed April 10, 1930 2 Sheets-Sheet 2

Fig. 2.

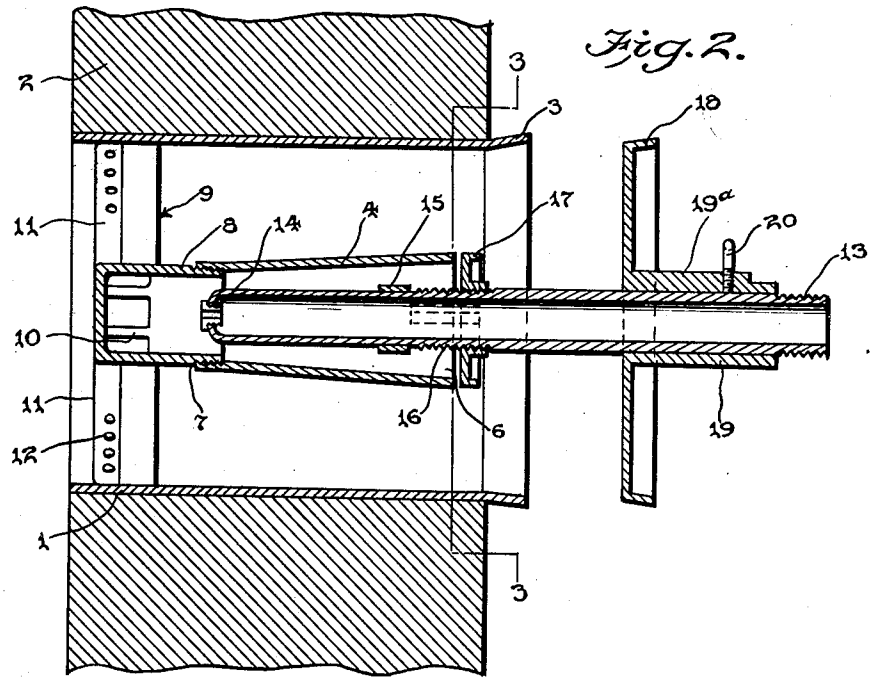
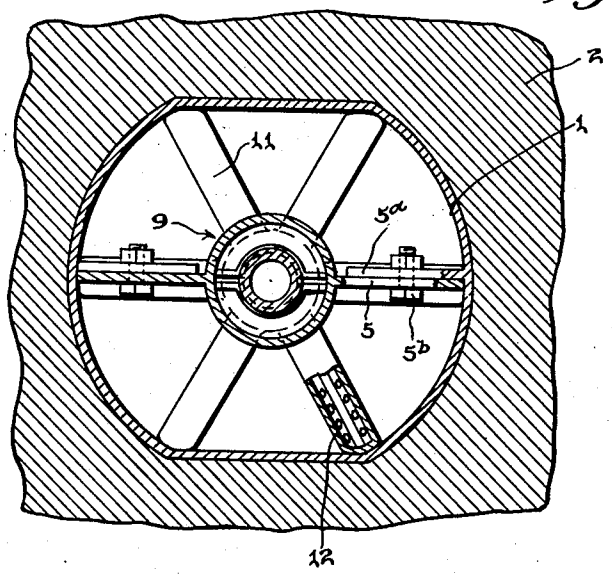


Fig. 3.



Inventor
John S. Zink,

By George A. Prevost
Attorney

Patented Oct. 6, 1931 1,826,588

UNITED STATES PATENT OFFICE

JOHN S. ZINK, OF TULSA, OKLAHOMA

GAS BURNER

Application filed April 10, 1930. Serial No. 443,131.

My invention consists in new and useful improvements in gas burners and relates more particularly to that class of burners known as pressure burners and adapted for installation in furnaces, boilers, stills and the like, where it is desirable to have a maximum heat with a minimum flame fire and where the gas fuel being used is of a very high heat value.

Many gasoline plants and refineries burn gas with a heat value as high as 2000 B. T. U. per cubic foot and with the conventional low pressure burner it is impossible to fire a boiler to a maximum temperature without smoke and fire running through the boiler and stack.

It is the object of my invention to overcome this disadvantage, and to this end I have provided a pressure burner which can be used with gas from two to thirty pounds gauge pressure, and one which is atmospheric injecting, rapid in mixing, and produces a short flame which can be readily controlled by the operator.

Another object of my invention is to provide a burner which is simple and sturdy in construction, easy to install, and one which cannot be damaged by water, oil or high furnace temperatures. When my improved burner is installed, the only portion thereof exposed to furnace temperature is the gas spreader which is preferably made of a metal, high in heat resisting properties and, due to my particular arrangement, is cooled by the incoming air on the outside, the expanding gas on the inside and at the face, and by the gas supply line carrying the heat back from the gas spreader and giving it up to the incoming air.

A further object of my invention is to provide independently operated controls or shutters for the induction of primary and secondary air for regulating the flame.

A still further object is to provide a spreader having a series of impinging jets, whereby the air and gas are mixed twice; first, in the atmospheric mixer, and second, by the impinging jets on the spreader.

It will be readily seen that my improved burner insures against explosion and fires due to liquids in the fuel supply line. The burner, once lighted, will not blow out, nor can the fire be jerked out by a sudden change in either the gas pressure or draft. Slugs of oil or gasoline will not put out the fire or run out on the boiler floor. In quantities of several barrels to the slug the only result will be smoke from the stack for a short period.

With the above and other objects in view which will appear as the description proceeds, my invention consists in the novel features herein set forth, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Referring to the drawings in which numerals of like character designate similar parts throughout the several views,

Figure 1 is a perspective view of the burner with portions of the structure broken away to illustrate the arrangement of parts.

Figure 2 is a longitudinal sectional view showing the burner installed in the wall of a still or furnace, and

Figure 3 is a lateral section taken on line 3—3 of Figure 2.

In the drawings, 1 represents a substantially elliptical barrel or casing, the upper and lower walls of which are flattened to facilitate its installation in the wall 2 of a still or furnace which is usually constructed of brick. The rear end of the barrel 1 projects beyond the wall 2 and flares outwardly in a flange 3 as clearly shown in Figures 1 and 2.

Within the barrel 1 and extending longitudinally and centrally thereof is a substantially cylindrical mixing tube 4 which tapers gradually toward the inner end of the barrel, said tube being removably secured within

said barrel by means of a suitable yoke arrangement preferably comprising two oppositely disposed, laterally extending arms 5, integral with the tube 4 and adapted to engage the under sides of inwardly projecting fins 5*a* integral with opposite inner walls of the barrel 1. The arms 5 and fins 5*a* are apertured to accommodate bolts 5*b*, whereby said tube 4 is retained in place. The outer end of the tube 4 is open as at 6, while the inner end is provided with internal threads 7 adapted to engage complementary threads on the central portion 8 of a gas spreader 9, located just within the inner end of the barrel 1.

This gas spreader 9 comprises a central chamber 10 provided with a series of hollow radiating arms 11. It will be noted that each of these arms has a relatively large passageway therein, and the side walls of each arm converge upwardly toward the top of the arm. These converging surfaces are arranged at angles to the top and are provided with a plurality of relatively large apertures 12, the axes of which are arranged substantially perpendicularly to the outer surfaces of the inclined portions of the side walls, whereby when the burner is in operation, jets of the gaseous mixture will exit through the apertures 12 under pressure, and will impinge against one another beyond the burner element, and at the lines of impingement will be mixed with secondary air admitted through the barrel 1.

13 designates a gas pipe which leads from any source of gas supply and extends into the mixing tube 4, terminating substantially at the inlet end of the chamber 10 of the gas spreader, said pipe being secured within said tube 4 by means of a yoke 15 which may be welded or otherwise connected to the inner wall of said tube. The inner end of this gas pipe 13 is closed and provided with a suitable apertured nipple 14 through which the gas is discharged into the chamber 10.

Adjacent the open end of the tube 4, the pipe 13 is provided with a series of external threads 16 adapted to engage complementary threads in the primary air control or shutter 17 which comprises a disc-like member centrally apertured to fit over the pipe 13 and adapted to be rotated thereon, said threads causing the same to move toward and away from the inlet end of the tube 4 to regulate the amount of air drawn in at this point.

The induction of secondary air into the barrel 1 is controlled by a second shutter 18 which is substantially of the same elliptical dimension as the outer end of the barrel 1, and slidably mounted on the pipe 13 adjacent the flanged portion 3 of the barrel. This shutter 18 is provided with a cylindrical projection 19 which surrounds the pipe 13, said projection being thickened as at 19*x* on its upper side and tapped to receive an adjusting and locking screw 20, whereby said shutter 18 may be moved along the pipe 13 toward or away from the inlet end of the barrel, and locked in the desired position.

The operation of my improved burner is obvious. When the shutter 17 is opened, primary air is induced at 6 and the flame becomes shorter and shorter until complete combustion takes place instantly at the face of the spreader, and when the large air shutter is adjusted on the pipe 13 it controls both the primary air induced into the tube 4 and the secondary air drawn through the barrel by the impinging jets and the stack draft. The function of the spreader 9 is substantially the same as that described in my pending application Ser. No. 299,046, filed Aug. 11, 1928, which has resulted in Patent No. 1,781,623, issued Nov. 11, 1930.

It will thus be seen that I have provided a simple, sturdy and efficient burner, capable of many uses and one in which a minute adjustment of the flame may be obtained through the medium of my improved dual air control and mixer.

From the foregoing it is believed that my invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details of construction without departing from the spirit of the invention as set forth in the following claims.

What I claim and desire to secure by Letters Patent is:—

1. A burner, including a horizontal barrel open at both extremities, at least one of the walls of said barrel being flattened to facilitate its installation in the wall of a still or furnace, a spreader located in said barrel, means for feeding a mixture of air and gas under pressure to the spreader, means to allow secondary air to mix with the gas discharged from the spreader beyond the point of discharge, and independently operated means for controlling both the quantity of air induced into the mixture fed to said spreader and the secondary air mixed with the gas beyond its point of discharge from said spreader.

2. A burner, including a barrel open at both extremities, the upper and lower walls of said barrel being flattened to facilitate its installation in the wall of a still or furnace, a mixing tube within said barrel carrying a spreader at one end, the latter being provided with a number of spaced radial arms, each having sets of diverging apertures arranged to cause jets of gaseous fluid to impinge beyond the arms, a pipe extending into the other end of said mixing tube for feeding gas under pressure into said tube, a shutter within said barrel adjacent the open end of said tube for controlling the quantity of primary air induced in said tube, and a second

shutter exterior of said barrel for controlling the quantity of secondary air induced through said barrel.

3. A burner as claimed in claim 1 including a mixing tube for feeding a mixture of air and gas to the spreader, said mixing tube being secured within said barrel by means of a plurality of laterally extending arms carried by said mixing tube and adapted to be supported from complementary inwardly projecting fins carried by the inner walls of said barrel.

In testimony whereof I affix my signature.

JOHN S. ZINK.