Dec. 9, 1924. 1,518,577

S. P. ENRIGHT

GAS HEATER

Filed Sept. 7, 1922 2 Sheets-Sheet 1

FIG. 1

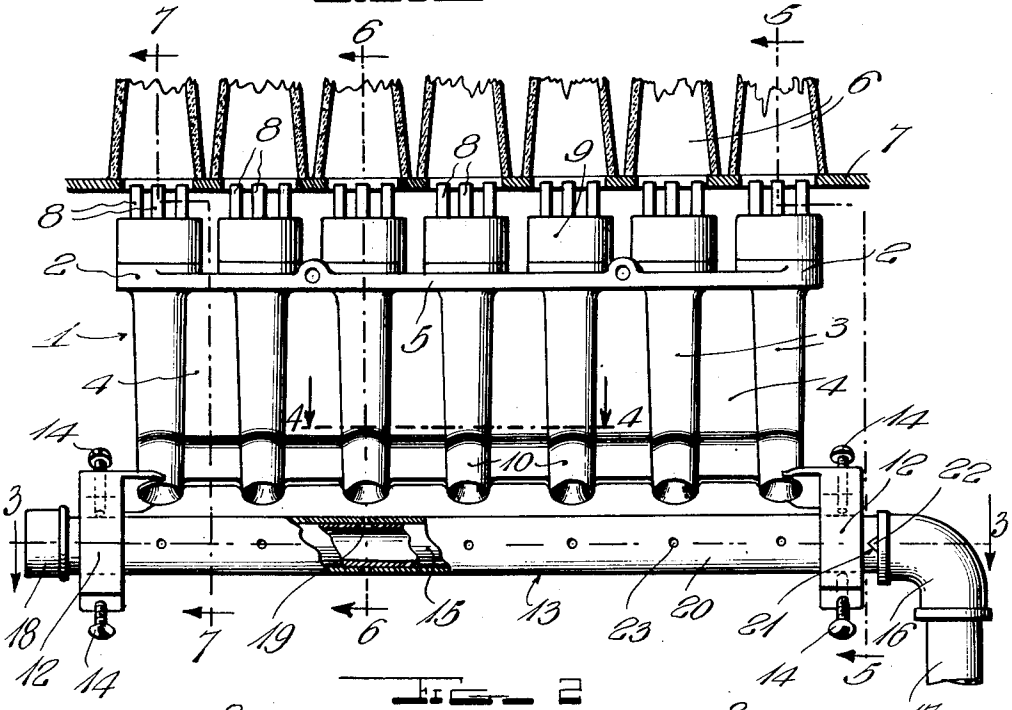


FIG. 2

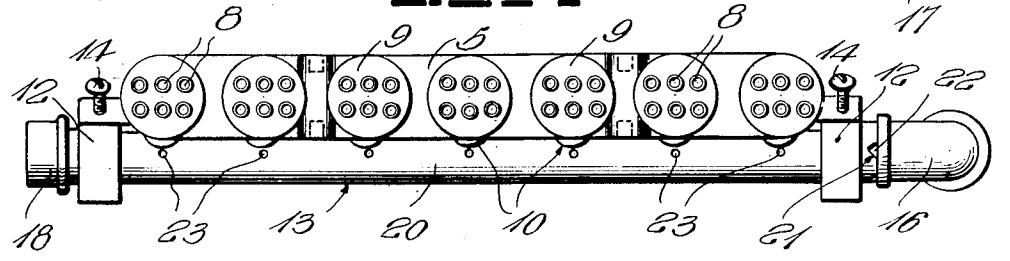


FIG. 3

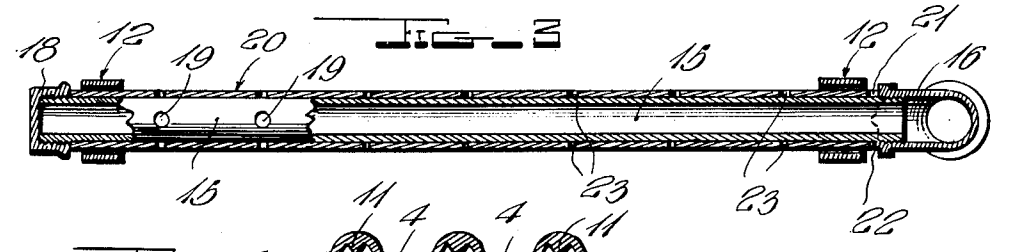


FIG. 4



Witness

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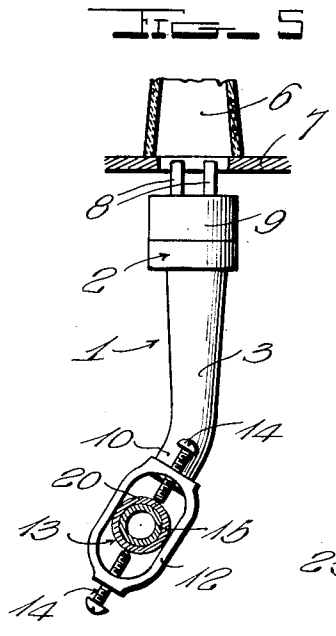


Fig. 5

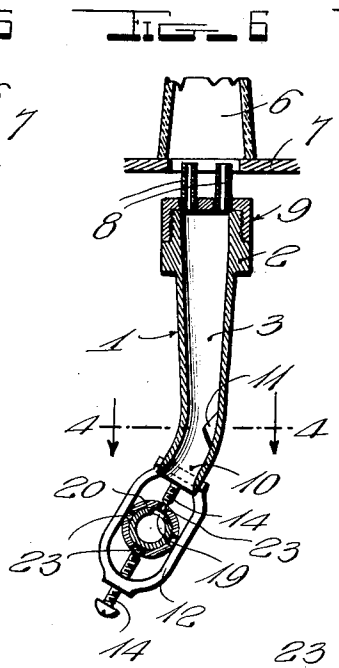


Fig. 6

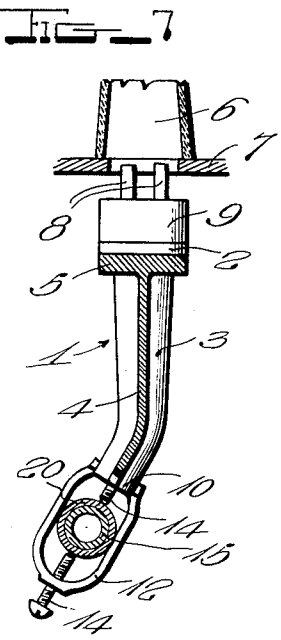


Fig. 7

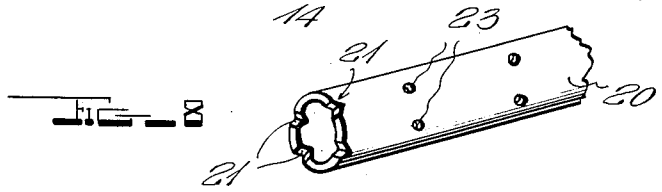


Fig. 8

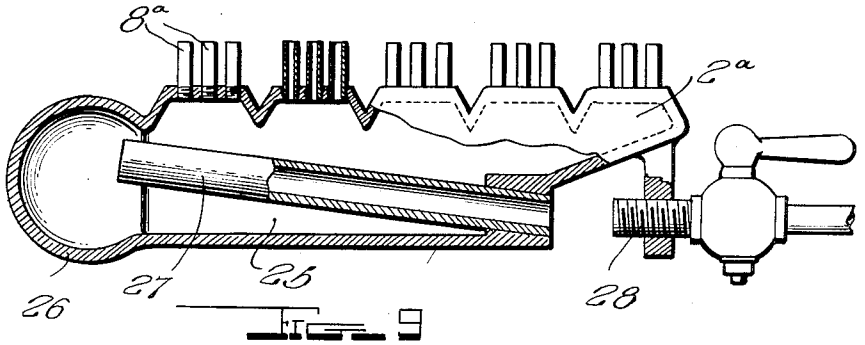


Fig. 9

Witness

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UNITED STATES PATENT OFFICE.

STEPHEN P. ENRIGHT, OF PITTSBURGH, PENNSYLVANIA.

GAS HEATER.

Application filed September 7, 1922. Serial No. 586,747.

To all whom it may concern:

Be it known that I, STEPHEN P. ENRIGHT, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gas Heaters; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved gas burner of general application, but has particular reference to a burner which is adapted for use in association with radiant gas stoves of the type employing a plurality of radiants which are heated to a state of incandescency by a plurality of flame jets projected from the heads of the burners into the radiants.

Devices of this character have been decidedly efficient when compared to numerous other kinds of burners and heaters used, but since the radiants are heated to such a high degree, there is the constant danger of the burner heads "burning out" from the excessive heat which is radiated from the radiants onto the burner heads.

Having conceived the disastrous results to which prior patented and marketed burners of the above type are subjected, it is my aim to provide a structure which will eliminate the possibility of the destruction of the burner head.

In carrying out my invention, I contemplate employing a burner wherein the head is practically self-cooled by the constant passage of air about the gas discharge tubes with which the head is equipped.

The above improved burner head is one of the prime features of the present invention. Another and important feature however, is the provision of means for producing a thorough and effective mixing of air and gas to produce efficient combustion, this result being obtained by the provision of specially designed conduits for the burner heads wherein the entrance of gas from the feeding device is restricted and is subjected to separation by an objection in its path.

A further object of the invention is to provide a burner which will operate to equal advantage whether used vertically or horizontally.

A still further object is to provide novel means for mounting the gas feeding tube so that it may be readily adjusted toward or away from the open ends of the several gas passages leading to the burner head.

Yet another object is to provide a valve tube rotatable about the gas feeding tube and having perforations of different sizes to be brought into use, according to the gas pressure.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, the description being supplemented by the accompanying drawings.

Figure 1 is an elevation partly in section showing the relation of the improved burner with respect to the radiants.

Figure 2 is a top plan view of the burner.

Figure 3 is a horizontal sectional view on line 3—3 of Fig. 1, partly in elevation.

Figure 4 is a detail horizontal section on line 4—4 of Figs. 1 and 6.

Figures 5, 6, and 7 are transverse sectional views as indicated by the lines 5—5, 6—6 and 7—7 respectively of Fig. 1.

Figure 8 is a perspective view of a portion of the valve sleeve.

Figure 9 is a side elevation, partly in section, showing the form of burner which is used for natural gas.

In the drawings above briefly described, the numeral 1 designates a burner body which, as here shown, includes a plurality of hollow burner heads 2 which are preferably of cylindrical form, each head being provided with a gas supply passage or tube 3, the several tubes being by preference joined integrally to each other by means of suitable webs 4. Similarly, a web 5 integrally unites the several heads 2.

The heads 2 are spaced slightly from the open ends of a plurality of radiants 6 which may be supported upon a plate 7 or in any other desired manner, forming no part of the present invention, except in connection with the improved burner. Each burner head is provided with a plurality of gas discharge tubes 8 which are comparatively long and are all of the same length and are spaced apart throughout their length, so that they may be air cooled at all times, whereby to effectively resist the intense heat radiated against them from the radiants 6. I have found that tubes of this character are much more effective than the use of spaced bars or strips of metal or numerous other arrangements which have been devised

for emitting a multiplicity of gas jets for heating the radiants 6. Preferably, although not necessarily, each burner head 2 includes a screw cap 9 carrying the tubes 8 and the latter may well be threaded in the caps, these features of construction being preferable on account of easy manufacture.

The free ends of the gas supply tubes 3 are disposed at an obtuse angle to the length of said tubes as clearly shown in Figs. 5, 6 and 7 and these ends are open to receive gas from a gas feeding device described below. This feeding device supplies jets of gas to the open tube ends 10 in line with their axes and I prefer to provide the tubes 3 with pointed ribs 11 located in their angles in position to be struck by the gas jets, whereby thorough agitation of the gas and air in the tubes will take place, to produce an effective combustible mixture. It is to be observed that the lower laterally directed ends of the tubes or conduits 3 are of a lesser diameter than the upper ends. With this arrangement, the entering gas is retarded until it comes into contact with the projections or ribs 11, by means of which it is thoroughly mixed with the incoming air. Above this mixing projection, the air and gas finds ample space for thorough mixing, the result being an extremely high temperature flame. I position the tube ends 10 at an obtuse angle to the lengths of said tubes, in order that the burner may operate either vertically or horizontally without there being any danger of gas escaping instead of entering the tubes and it will be understood that when said burner is used in a horizontal position, the ends 10 will slant downwardly.

In the form of construction herein disclosed, the ends of the burner body are provided with elongated yokes 12 receiving the gas feeding device 13, set screws 14 being threaded through the ends of said yokes for adjusting the device 13 toward or from the tube ends 10, as occasion may require.

The preferred form of gas heating device includes a gas feeding tube 15 connected by an elbow 16 with the gas supply pipe 17, the other end of said tube being provided with a screw cap 18. The tube 15 is provided with a plurality of gas discharge openings 19 positioned opposite the tube ends 10 and I provide a valve tube 20 which is rotatable upon the tube 15 and is normally held against movement thereon between the elbow 16 and the cap 18, said tube 20 being formed with a plurality of notches 21 in one end, any one of which may engage a detent 22 on a shoulder in the form of an elbow 16, so that the tube 20 will be held in adjusted position. This tube is provided with several sets of discharge openings, each set consisting of a plurality of different sized openings, indicated by the reference numerals 23. By loosening the cap or retaining collar 18, the tube 20 may be turned to aline openings 23 of the proper size with the openings 19 of the tube 15 and it will thus be seen that the size of the gas discharge openings may be adjusted, according to the gas pressure. This adjustment is made when installing the heater and unless there is some serious variation in the gas pressure at a later date, the adjustment need not be changed.

In Fig. 9, I have shown a burner construction which is preferable for use in connection with natural gas. In this view, the gas discharge tubes 8^a are carried by relatively thick head portions 2^a of a horizontally elongated burner body 25 whose interior constitutes an air and gas mixing chamber. This body terminates at one end in a hollow substantially spherical portion 26 and a gas and air supply pipe 27 leads into this spherical portion from the opposite end of the burner body, an appropriate valved gas nozzle 28 being provided to feed a jet of gas into the tube 27. By this arrangement, the gas and air entering through the tube 27, will be whirled around within the sphere 26 and it will therefore be seen that a thorough mixture will take place, insuring proper combustion.

I wish to direct particular attention to the several advantages for employing a cluster of small tubes in connection with each burner cap. It has been found that if the burner caps become overheated, not only are they injured, but the efficiency of the heater will be impaired by defective combustion and discharge of a very disagreeable odor, which is seriously unhealthy. Also, overheated burner caps cause carbon to accumulate, this carbon attracts more heat, and the usefulness of the burner would thus be greatly impaired, without the use of the tubes. Other devices now in use, such as spaced strips of metal or cross bars of metal and burner heads and tips of numerous other designs, all have more or less difficulty with accumulated carbon which, in addition to attracting heat often causes backfire, making it necessary to immediately shut off the gas. The arrangement of tubes which I employ, eliminates all of the above difficulties, as well as practically making the burner fool proof.

Since excellent results may be obtained from the details disclosed, they are preferably followed but within the scope of the invention as claimed, numerous minor changes may of course be made.

I claim:

1. In a gas heater burner of the type having a plurality of spaced radiants and gas containing means spaced below said radiants; a plurality of groups of long slender parallel gas discharge tubes rising

from said gas containing means to but not into said radiants, one group of tubes being provided for each radiant, the tubes of the several groups being of equal lengths and of uniform diameters throughout their lengths, and being spaced apart and entirely exposed to free air on all sides, whereby to permit free circulation of such air around the tubes for cooling purposes.

2. In a gas heater burner of the type having a plurality of radiants and an equal plurality of spaced vertical gas discharge tubes spaced below and alined with said radiants; screw caps threaded on the upper ends of said tubes and each having a plurality of small openings, long slender parallel gas discharge tubes secured in said openings and projecting vertically from said caps to but not into the radiants, said slender tubes being of equal lengths, of uniform diameters throughout their lengths, spaced apart throughout such lengths, and entirely exposed to free air on all sides, whereby to permit free circulation of such air around the tubes for cooling purposes.

3. The combination with a gas supply passage leading to a burner head, of a gas feeding tube extending across the inlet end of said passage and having a gas discharge opening opposite said passage, and a valve tube snugly surrounding said feeding tube and having a plurality of circumferentially spaced openings of different sizes, any one of which is adapted to register with the gas discharge opening of said feeding tube when the valve tube is turned, whereby to regulate the amount of gas fed to said passage, said gas feeding tube having a fixed shoulder at one end and a clamping collar at its other end, said shoulder and collar contacting with the ends of said valve tube to hold the latter in adjusted position.

4. The combination with a plurality of parallel open ended passages leading to an equal plurality of burner heads; of a gas feeding tube extending across the open ends of said passages and having gas discharge openings opposite the same, and a valve tube snugly surrounding said feeding tube and having sets of circumferentially spaced openings of different sizes, any corresponding openings of the several sets being adapted for registration with the gas discharge openings of said feeding tube when said valve tube is turned, whereby to uniformly regulate at a single operation the amount of gas fed to said passages.

5. A structure as specified in claim 3; said tubes having respectively a series of notches and a detent engaging them to hold the valve tube in any set position.

In testimony whereof I have hereunto affixed my signature.

STEPHEN P. ENRIGHT.