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F. V. RISINGER

GAS BURNER

Filed March 17, 1924

Fig. 1.

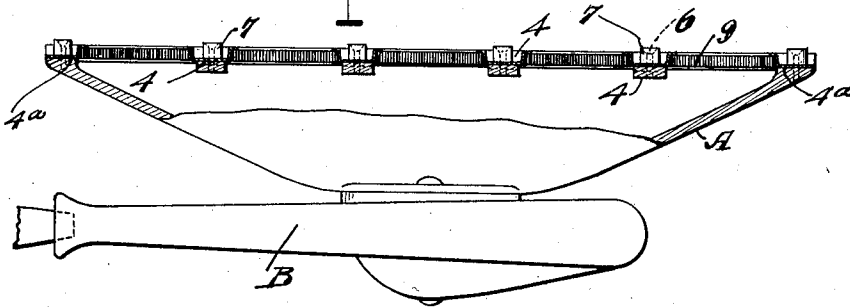


Fig. 2.

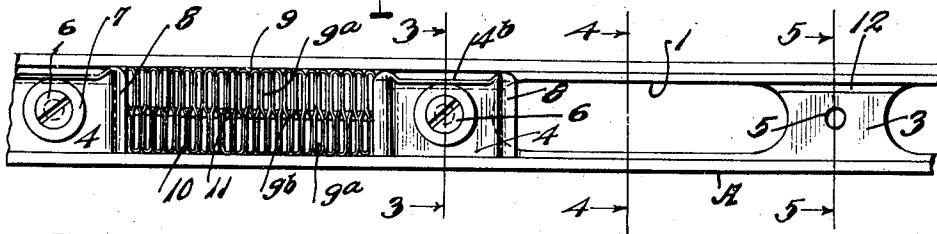


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

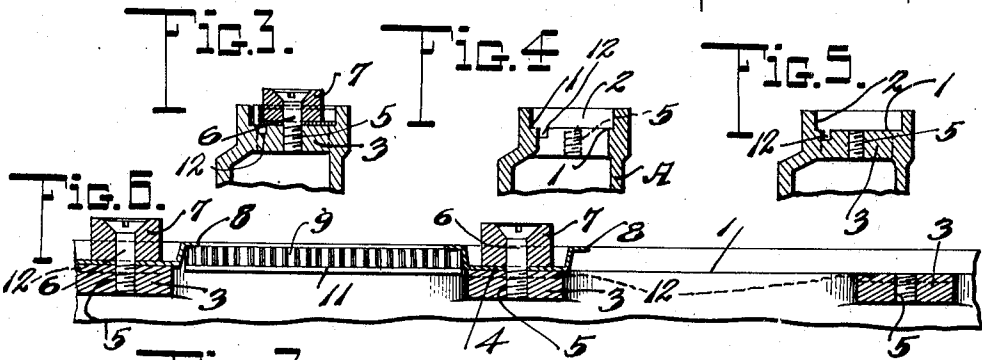
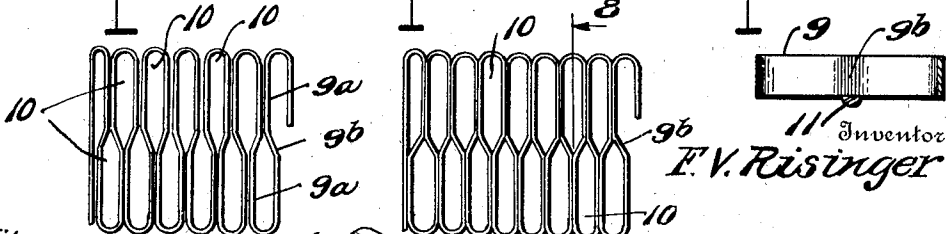


Fig. 7.

Fig. 8.

Fig. 9.



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GAS BURNER.

Application filed March 17, 1924. Serial No. 699,896.

This invention involves a novel burner construction designed primarily for use in connection with gas heaters of the class known as radiant heaters.

I have designed my burner improvements with a primary view of accomplishing the following essential objects:—

First, the gas burner of the invention is so constructed as to produce a heating flame to act upon the radiant heating members of the stove or heater, which flame is generated from a mixture of gas and air in which the air ratio is much increased as compared with present types of burners, and possesses a greater buoyancy than heretofore secured. The greater buoyancy of the flame of the burner construction results necessarily in a higher efficiency of the radiant members because of the increased effective operative area obtained for the radiation of the heat created by the flame.

Secondly, my burner has been designed especially to obtain the high air ratio flame to create the maximum of heating temperature, but made so as to obviate liability of "flash-backs" in the operation of the burner.

Third, an important object of the invention has been to accomplish such a thorough and complete admixture of the air and gas supply to the burner for purposes of combustion, as to insure a smooth and quiet burning flame during the use of the heating appliance. Such thoroughness of gas and air admixture reduces very materially the possibility of generation and escape of carbon monoxide gas, the danger of which is quite obvious to those versed in the art.

The objects of my invention are attained principally through the peculiar construction of the burner opening provided in my appliance, the use of an especially novel form of grid member or members at the burner opening, and the provision of novel attaching means for the grid members. My new type of grid member is such that a far greater area of gas outlet openings for the entire burner construction is obtainable than in the construction at present commonly in use in the radiant heater type of gas stove. My burner opening is so made that while it effectively supports the grid members in proper operative positions, the parts between the two enabling them to mutually act for the above purpose in no way interferes with the utilization of the full operative area of the burner jets which control the

effective area of the burner opening itself.

I claim additionally as a special feature of novelty of my invention, an arrangement of grids creating a number of series of burner jets, each series spaced from the other, with special passage areas between the adjacent series of jets whereby lighting of the burner is facilitated through the use of these passage ways which form little conduits to carry gas freely from the burner area of one grid to that of another.

My invention additionally includes specific features of construction as for instance the formation of the burner grids by the use of a single strip of metal folded and re-folded, or bent and rebent upon itself, to provide contacting series of grid bars portions of which are spaced apart to create jet openings, which openings may be characterized as separated on a longitudinal medial line of each grid so that the jets formed on opposite sides of such line may be said to taper slightly at their adjacent or facing end portions. I utilize novel means for preventing warping of my grids when clamped in place, and for clamping them in place on the burner body proper.

In the accompanying drawings:

Fig. 1 is a front view of a radiant burner embodying my invention, same being partially broken away at the top to show more clearly the mounting of the grids and general relation and mode of attachment of the same.

Fig. 2 is a fragmentary top plan view of the upper end of the burner showing one of the grids in position therein and certain clamping plates in operative relation thereto; also the formation of the channel at the top of the burner as seen when the grids are detached.

Figs. 3, 4 and 5 are vertical sectional views of a fragmentary nature taken on the lines 3—3, 4—4, and 5—5 of Fig. 2, respectively.

Fig. 6 is a longitudinal sectional view taken through the portion of my burner construction illustrated by Fig. 2.

Fig. 7 is a view illustrating a metal strip bent into the form generally shown as when preliminary to giving to the grid its ultimate form; in other words, the strip has its bent and rebent or folded portions spaced out slightly and abnormally to more fully illustrate how it is made.

Fig. 8 shows the ultimate formation

given to the strip of metal that constitutes the grid when it is ready for use, excepting that the reinforcing rod or member on its bottom is omitted.

Fig. 9 is a cross sectional view of one of the grids when complete, taken about on the line 8—8 of Fig. 8.

Fig. 10 is a detailed perspective view of one of the clamping plates for the grids.

In the carrying out of my invention I utilize a burner A, largely of the construction illustrated in my pending application for Patent Serial No. 629,193, filed March 31, 1923, the said burner being comprised of a casting which is relatively long and comparatively narrow to provide a long burner outlet or head such as ordinarily required for radiant heater purposes. There is connected with the lower portion of the burner body A the Bunsen tube B, the arrangement and formation of which constitutes a feature of novelty of my invention but are not the subject matter of this application.

As the present invention involves primarily the formation of the outlet or top of the burner A, in conjunction with the grids carried thereby, reference will now be made to these particular things. At its top the burner A is provided upon the inner surfaces of its sides with longitudinal shoulders or ledges 1, and these virtually form a channel 2 extending from one end of the burner to the other. At intervals in the length of the channel, the walls or sides of the burner are connected by relatively narrow webs 3, upon which webs are mounted clamping plates 4.

The webs 3 are tapped with threaded openings 5 into which screws 6 are screwed to cooperate with collars 7, of metal or the like, for the holding of the clamp plates 4 in position. The clamp plates 4 are very simply constructed by forming at their ends flanges 8 that overlap the ends of the grids 9. Where the clamp plates 4 are mounted upon webs 3 intermediate the ends of the burner A, said plates have the clamping flanges 8 at opposite extremities for cooperation with two adjacent grids 9, but the end plates 4^a are so equipped with single flanges only, the same alone being required.

The grids 9 which constitute an especially important feature of the invention will be seen as consisting of a single narrow strip of metal bent to provide contacting elongated coils. These coils are made by bending the metal back and forth upon itself to provide straight parallel walls 9^a at opposite ends of each coil, said walls being bent intermediate their ends so as to deflect them laterally as at 9^b, whereby the walls at one end of each coil surround a jet opening and the walls at the opposite end are at one side of an opposing jet opening. The portions 9^b of the coils therefore practically

separate the coils into two opposite sections which provide opposing series of jet openings 10 separated about on a line medial longitudinally of the grid. These jet openings 10 taper out their adjacent or facing extremities owing to the provision of the portions 9^b of the coils of the grid.

It will be seen from the foregoing that while the grids 9 are made of continuous lengths or strips of metal, they are formed in such a way as to provide a relatively large area of jet spaces, conducive to the increased air ratio of space for the burner to which I have previously referred.

My grids 9 are provided with rods 11, of wire or the like, at the bottom of the coils of which they are composed, which rods are made of wire or any suitable material of a size not interfering with the free passage of the gaseous mixture through the burner for combustion purposes, and said rods 11 are preferably employed as a simple expedient for preventing warping or doubling up of the grids 9 when clamped into position on the burner by the clamping plates 4 and 4^a.

The mounting of the grids 9 on the burner A is rather apparent on reference to the drawings, but it is especially noted that the supporting relation between the grids and burner is established by seating of the grids in the channel 2 with the outermost ends of the coils of each grid resting upon the shoulders 1 at opposite sides of the channel. The width of each shoulder 1 preferably corresponds substantially to the thickness of the strip of material from which the grids 9 are made, or very slightly greater, so that the full operative area of the jet openings 10 is availed of for all substantial purposes in the operation of the burner.

It is notable that the several intermediate webs 3 spanning the burner opening outlet of the burner A, are formed with very narrow passages 12 in line with one wall of the channel 2 and extending to a very shallow degree downwardly into the webs. Likewise, it will be observed that the intermediate clamping plates 4 are formed with the upturned longitudinal edge flanges 4^b, which flanges are in substantial alinement with the inner walls of the passages 12. The above relative arrangement of the passages 12 and flanges 4^b of the clamping plates, is such that there are established between the gas openings, over which the several grids 9 extend, a series of flame carrying passages. Thus when the gas is turned on to supply the burner A with gas and air for combustion and the burner is lighted adjacent to an end or any intermediate portion of the same, the flame, which of course is generated at the particular place where the gas is lighted above one of the grids 9, will quickly shift along the whole burner to the other grids

because the gaseous mixture issuing from the passages 12 alongside the flanges 4^b will ignite and quickly communicate the flame of combustion to the gas flowing up through an adjacent grid.

When the various grids are lighted, the entire operative burner jet area of the burner is utilized, and owing to the peculiar formation of the grids in providing the numerous closely spaced jets, a maximum amount of heating flame will be generated. Furthermore, owing to the shape, arrangement, and depth of the jets formed in the grids 9, liability of "back-flashes" or "flare-backs" of the flame when the burner is lighted are obviated.

The grids 9 are preferably made by machines adapted for the operation of bending and rebending the strip of metal utilized for the purpose of forming each grid.

The formation of the grid, of course, provides a series of bars transverse to the elongated opening in which the grid is seated, these bars being bent as described to form the end facing tapering gas jets.

It will be understood that within the purview of my invention I contemplate modifying the exact formation of the grids, and the means for attaching them in place, within the spirit of my invention as contemplated by the scope of the annexed claims. Obviously the specific clamping means for the grids might be altered without materially affecting the efficiency of the burner features and other details of construction might likewise be reasonably modified.

It is notable that by having said portions of the sides of the bars or members of each grid in contact with one another a mutual bracing action is obtained therebetween. This action is such as to effectively maintain the formation of the grid as predetermined at the time of manufacture thereof, there being no liability of warping of the bars or cross members even though the strip of material on which the grid is made is relatively thin so as to occupy a minimum amount of space across the burner opening or outlet.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a burner of the class described, a burner body having an elongated outlet forming a burner opening, and a grid comprising a length of metal bent and rebent to form the grid which is seated in said burner opening, the bent and rebent parts of the grid having contacting portions to brace the said parts.

2. In a burner of the class described, a burner body having an elongated outlet forming a burner opening, and a grid comprising a continuous strip of material folded and refolded on itself to provide spaced

grid bars, the burner opening having shoulders at opposite sides to support the grid, and on which the folded and refolded parts of the strip are seated.

3. In a burner of the class described, a burner body having an elongated outlet forming a burner opening, a grid comprising a continuous strip of material folded and refolded on itself at its front and rear to provide spaced grid bars, the burner opening having shoulders at opposite sides to support the grid at its front and rear edges, and means to engage the grid at its ends to fasten it to the burner body.

4. In a burner of the class described, a burner body having an elongated outlet comprising opposite walls and forming a vertical burner opening, a grid comprising a continuous strip of material folded and refolded on itself to provide spaced grid bars, the burner opening having shoulders in said walls at opposite sides to support the grid, and a reinforcing element applied to the grid longitudinally of the same and transverse to its bars to prevent buckling of the grid.

5. In a burner of the class described, a burner body having an elongated outlet forming a burner opening having opposite walls, a series of grids located end to end at intervals in said opening and spaced from one another, and means to clamp the grids at their ends to the burner body, the grids comprising transverse spaced bars, with means to prevent distortion or buckling of the grids when clamped in operative position.

6. In a burner of the class described, a burner body having an elongated outlet forming a burner opening, a series of grids located at intervals in said opening and spaced from one another, means to clamp the grids at their ends to the burner body, and gas passages connecting the flame areas of the grids.

7. In combination, a gas burner having an elongated burner outlet, webs spanning said outlet at intervals forming spaced burner openings, grids arranged end to end between the webs and over the said openings, and means on the webs to secure the grids in place, each grid comprising a continuous member forming a series of bars transverse to the openings over which the grids are fitted.

8. In combination, a gas burner having an elongated burner outlet, webs spanning said outlet at intervals forming spaced burner openings, grids between the webs and over the said openings, and means to secure the grids in place, each grid comprising a continuous member forming a series of bars transverse to the openings over which the grids are fitted, and the securing means consisting of clamps engaging the ends of the grids and detachably applied to said webs.

9. In combination, a gas burner having an elongated burner outlet, webs spanning said outlet at intervals forming spaced burner openings, grids between the webs and over the said openings, and means to secure the grids in place, the webs being formed with gas passages to connect the flame areas of one grid with that of an adjacent grid.

10. In combination, a gas burner having an elongated burner outlet, webs spanning said outlet at intervals forming spaced burner openings, grids between the webs and over the said openings, and means to secure the grids in place, the webs being formed with gas passages to connect the flame areas of one grid with that of an adjacent grid, the securing means including clamps attached to the webs, to engage the ends of the grids, and formed with flame passages communicating with the said gas passages.

11. In combination, a gas burner having an elongated burner outlet, a grid at said outlet and comprising a continuous bent member formed into spaced parts over the outlet, said parts contacting at intervals to mutually brace one another.

12. In a burner of the class described, a burner body having an elongated outlet comprising opposite walls and forming a burner opening, a grid comprising a continuous strip of material folded and refolded on itself to provide spaced grid bars, the burner opening having shoulders at opposite sides to support the grid, and a reinforcing element applied to the bottom of the grid longitudinally thereof.

13. In a burner of the class described, a burner body having an elongated outlet forming a burner opening, a series of grids located at intervals in said opening and spaced from one another, and means to clamp the grids at their ends to the burner body, comprising clamp members disposed in the intervals between the grids and each cooperative with two of the grids at adjacent ends to prevent their displacement.

14. In a burner of the class described, a burner body having an elongated outlet forming a burner opening, a series of grids located at intervals in said opening and spaced from one another, the burner body being provided with gas passages connecting the flame areas of the grids.

15. A grid for radiant burners comprising a strip of metal bent to provide a series of bars in substantial parallel relation and spaced to form plane jets two deep from the front to the rear ends of the grid.

16. A grid for radiant gas burners com-

prising a strip of metal folded and refolded upon itself to form a series of spaced grid bars, and having bent portions intermediate the ends of the bars extending laterally to establish contact at such points between the bars so that they have mutual bracing action one relatively to the other.

17. A burner grid, consisting of a strip of metal doubled back and forth and having intermediate lateral bends forming two rows of substantially parallel bars with the walls of the openings formed of two thicknesses of the strip.

18. A burner grid, consisting of a strip of metal doubled back and forth and having intermediate lateral bends whereby two rows of passages are formed, one row of passages being out of line with the other row.

19. A burner grid, consisting of a strip of metal doubled back and forth, and having lateral intermediate bends forming two rows of out of line openings with the walls of the openings consisting of a doubled thickness of the metal and a burner having a vertically disposed burner opening across which said grid is arranged.

20. In a burner the combination of a horizontal vertical body with an open top, of a strip of metal doubled back and forth horizontally to form substantially parallel horizontal bars, said strip set on its lower edge in the open top of the burner body, whereby vertical parallel unimpeded gas passages are formed, for the purpose described.

21. An improved burner, comprising a horizontal body having an open top, a strip of metal doubled back and forth in spaced relation across the open top and set on edge to form vertical parallel cross openings, for the purpose described.

22. In combination, a gas burner having an elongated burner outlet, the outlet having a longitudinal channel, and a series of grids seated in said channel, each grid comprising spaced bars within the channel, and means on the burner to detachably clamp all of the grids in position in the channel.

23. A burner screen in the form of a substantially rectangular body and constructed of a single piece of sheet metal bent back and forth upon itself to provide a series of side by side parallel sections, the adjacent sections touching at certain points and at others being spaced apart to provide comparatively deep and narrow passageways.

In testimony whereof I affix my signature.

FRANK V. RISINGER.