March 3, 1959 C. W. NESBITT 2,875,820

IGNITION CARRY-OVER FOR GAS BURNERS

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Fig. 1

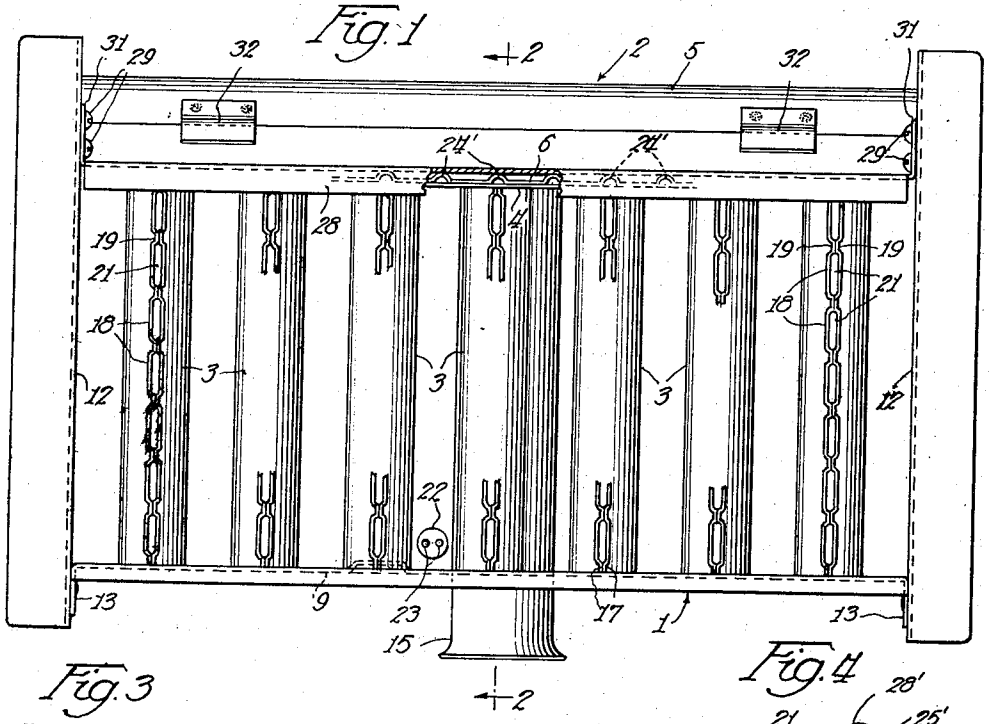


Fig. 3

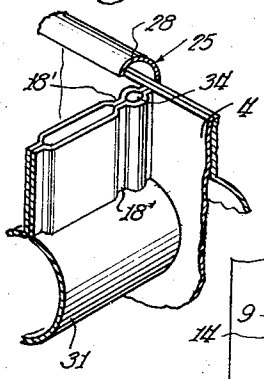


Fig. 4

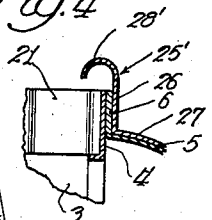


Fig. 2

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IGNITION CARRY-OVER FOR GAS BURNERS

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The invention relates generally to gas burner structures, and more particularly to a carry-over device for effecting ignition from a single pilot flame of gas discharged from a plurality of burner elements of such a burner structure.

The invention has among its objects the production of a gas burner ignition device which is very simple in construction, readily adapting itself to fabrication from sheet metal stampings, and which is very efficient in operation whereby carry-over ignition is positive and foolproof.

Another object of the invention is the production of an ignition carry-over structure which may be easily cleaned, and which is so designed that it may be readily embodied in burner structures of various types and shapes.

A further object of the invention is the production of an ignition carry-over structure which may be readily embodied in certain types of burner structures with substantially no change in the design of such structures.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end, my invention consists in the novel construction, arrangement, and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts:

Fig. 1 is a top plan view of a burner structure embodying the present invention;

Fig. 2 is a sectional view taken approximately on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary, perspective view of a modified form of the invention; and

Fig. 4 is a transverse, sectional view through another form of the invention.

The present invention readily adapts itself for use in burner structures fabricated from sheet material, and is illustrated in the drawings in connection with this type of burner structure. Referring to the drawings, and particularly to Figs. 1 and 2, the reference numeral 1 indicates generally a gas burner structure comprising a longitudinally extending manifold structure, indicated generally by the numeral 2, operatively connected to which are a plurality of burner tubes 3 which extend in spaced, parallel arrangement from the manifold 2. In the construction illustrated, the manifold 2 comprises a substantially flat sheet 4 and a semicircular sheet 5 having longitudinally extending flanges 6 which are welded, or otherwise secured, in air-tight relationship to the sheet 4. The sheet 4 is provided with a plurality of outwardly flanged openings 7, the flanges 8 of which extend into the adjacent ends of the respective burner tubes 3 which are secured thereto by welding, or other suitable means.

The opposite end of each burner tube 3 is closed by a longitudinally extending plate or sheet 9 which is

formed with a series of bosses 11, each adapted to engage the adjacent end of a respective burner tube, the latter being secured thereto by any suitable means to provide an air-tight joint. The end edges of the members 4 and 5 of the manifold 2 are secured to respective side plates 12 which operatively seal the ends of the manifold and, in like manner, the ends of the plate 9 are operatively secured to the end plates 12 by means of the flanges 13 formed on the ends of the plate 9, the flanges being secured by spot welding 14, or other suitable means, to the end plates. Secured to the plate 4 and operatively communicating with the interior of the manifold 2 is a suitable inspirator tube 15 which is adapted to conduct gas discharged from a suitable gas nozzle 16 into the manifold from which it is distributed to the burner tubes 3.

The burner tubes 3 are each formed from suitable sheet material, with the free, longitudinal edges of the material forming the sheet terminating in substantially parallel flanges 17. The flanges 17 on each burner member are provided with corrugations 18, inwardly extending abutting portions 19 of the respective flanges being suitably secured together by welding, or the like, thus producing a longitudinally extending series of burner ports 21. Automatic ignition of the entire burner is adapted to be initiated from a small pilot flame which is located at the top of a pilot member 22, having a pair of gas ports 23 in the upper end thereof whereby, upon flow of gas through the burner, the constantly burning flame from the pilot will ignite gas being discharged from the burner ports of one or both of the two adjacent burner tubes. It will be apparent, however, that the respective series of ports in the burner tubes are so spaced from the series of burner ports of adjacent tubes to normally preclude ignition from one burner tube to the other without the accumulation of too much free gas around the burner structure. To insure rapid ignition of gas from all burner ports, I have therefore provided a novel carry-over device by means of which an ignition flame is carried from one series of burner ports to the next.

In the embodiment of the invention illustrated in Figs. 1 and 2, the upper flange 6 of the semicircular manifold member 5 is provided with a series of small channels or grooves 24 in the outer face of the flange 6 which is secured to the adjacent sheet 4, the channels 24 forming small gas ports 24' along the upper edges of the flange 6 and sheet 4, as clearly illustrated in Fig. 2. Positioned above the ports thus formed is a longitudinally extending carry-over member 25 having a vertically extending portion 26 terminating along its lower edge in a flange 27 adapted to seat on the upper surface of the member 5. The upper edge of the member 25 is shaped to provide a generally inverted, U-shaped portion or canopy 28 which overlies the ports 24' formed by the channels 24. In the embodiment of the invention illustrated, the carry-over member 25 is secured to the burner structure by suitable sheet metal screws 29, or the like, passing through flanges 31 formed on the ends of the member 25, the screws 29 being threaded into the end plates 12. The intermediate portions of the member 25 may be held in operative position by a plurality of clips 32 secured to the member 5 of the manifold, having offset portions 33 which overlie adjacent portions of the flange 27, thereby retaining the latter in engagement with the member 5.

In activating the burner, gas is discharged from the nozzle 16, through the inspirator tube 15, into the manifold 2, from which it is distributed into the respective burner tubes 3, and discharged from the ports 21 thereof. Simultaneously therewith, gas will be discharged from the

ports 24', and trapped or accumulated beneath the portion 28 of the carry-over member 25, the gas flowing longitudinally along the under side of the carry-over member, whereby the mixture will extend substantially throughout the length of the strip. As gas is discharged from the burner ports 21 of the two tubes 3 adjacent the pilot ports 23, such gas from either or both tubes will be ignited by the continuously burning pilot flame at the port 23, with ignition carrying over from one port 21 to the next of such burner tube or tubes. When the last burner port 21 adjacent the member 25 of either of the two burner tubes adjacent the pilot is ignited, such ignition will, in turn, ignite the gas trapped under the member 25, whereby an ignition flame will travel in both directions beneath the portion 28 of the member 25. As such ignition flame reaches each series of ports 21 of succeeding burner tubes, gas from the adjacent port 21 of the latter will likewise be ignited, followed by ignition of the remaining ports associated therewith, thereby igniting the entire burner structure.

The construction illustrated in Fig. 3 is similar to that just described, the only difference being that the port supplying gas to the carry-over member 25 is formed on the burner tubes 3 instead of on the manifold member 5. In this construction, the flanges 18' of the burner tube 3' are provided with a small port 34 at the end thereof adjacent the plate 4, with the port 34 being positioned below the portion 28 of the carry-over member 25, whereby gas from the port 34 will accumulate under the latter. Obviously the operation of this construction would be similar to that heretofore described, the carry-over ignition, however, being not quite as rapid as that of the construction illustrated in Figs. 1 and 2 inasmuch as no port or ports are provided beneath the carry-over member intermediate the respective burner tubes, the carry-over member being supplied only from ports at each respective burner tube 3. In this construction, however, it is not necessary to provide the manifold member 5 with a corrugated flange.

The construction illustrated in Fig. 4 is very similar to that shown in Fig. 3, the gas accumulated in the member 25 being obtained from the port 21 of each burner tube adjacent the carry-over member. In this construction, the portion 28' of the member 25' is of a width to sufficiently overlie the adjacent end ports 21 of the burner, and thus divert a portion of the gas being discharged therefrom beneath the portion 28'. Gas will therefore be accumulated along the length of the member 25', and upon ignition from one of the burner tubes, the ignition flame will travel to the other burners, as has been previously described. This construction has the advantage of eliminating any special forming of either the manifold or the burner, resulting, however, in a somewhat slower ignition of the other burners than achieved with the construction illustrated in Figs. 1 and 2, wherein gas is discharged beneath the manifold member 25 not only at the respective burner tubes, but also intermediate the same.

It will be noted that in all three forms illustrated, the desired results are achieved by providing means for trapping or accumulating gas along a carry-over member which is so related to the respective burner tubes or elements that ignition of gas along one burner tube will result in ignition of the gas along the carry-over member, and ignition therefrom to the respective burner tubes or elements. It will be noted that as the carry-over member 25 is removably attached to the burner structure, it may be readily detached therefrom to permit access to the auxiliary ports 21' or 34. In the construction illustrated in Fig. 4, as the adjacent ports 21 are substantially completely exposed, the member 25', if desired, may be permanently secured to the burner structure. It will be apparent from the above disclosure that while I have provided a carry-over structure which is illustrated as including a straight member, the carry-over member may be curved, or otherwise shaped, to accommodate its application to burners of various sizes and shapes. It will also be noted that, in any of its forms, the invention may be applied to various types of burner structures with relatively little or no modification of the latter.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement, and combination of parts herein shown and described, or uses mentioned.

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

1. In a carry-over structure for gas burners, the combination of a burner structure including an elongated manifold and a plurality of burner elements extending transversely therefrom, each having a series of burner ports therein, the ports of each series being positioned sufficiently close to one another that ignition of gas discharged from one port will cause ignition of gas discharged from the next adjacent port, each respective series of ports being spaced a substantial distance from the adjacent series of ports, a detachably mounted carry-over structure extending from adjacent the ports of one burner element to the ports of an adjacent burner element, said carry-over structure including an inverted U-shaped member arranged with respect to said burner structure to receive gas from the ports thereof, said inverted U-shaped member including a front leg and a rear leg, said front leg of the inverted U-shaped member extending downwardly contiguous to the plane of the ports and the edge of the front leg spaced slightly therefrom providing a transverse space between the plane of the ports and the edge of the front leg and extending longitudinally of the inverted U-shaped member, said rear leg of said inverted U-shaped member also extending downwardly substantially perpendicular to the plane of the ports and extending longitudinally of the U-shaped member and operatively affixed to the manifold to accumulate such gas along the member, the spacing of the ports from which gas is so accumulated being such that upon ignition of such accumulated gas an igniting flame will extend along said inverted U-shaped member to the burner ports of adjacent burner elements, said rear leg provided with a transverse portion complementally formed to and contacting the contiguous portion of the elongated manifold, and securing means comprising laterally spaced clips affixed to the manifold for detachably mounting and affixing the carry-over structure to the elongated manifold.

2. In a carry-over structure for gas burners, the combination of a burner structure including an elongated manifold and a plurality of burner elements extending transversely therefrom, each having a series of burner ports therein, the ports of each series being positioned sufficiently close to one another that ignition of gas discharged from one port will cause ignition of gas discharged from the next adjacent port, each respective series of ports being spaced a substantial distance from the adjacent series of ports, a carry-over structure extending from adjacent the end port of one burner element at the manifold end thereof to the corresponding end ports of other burner elements, said carry-over structure including an inverted U-shaped member extending contiguous to and above the elongated manifold and positioned above and partially overlying adjacent end ports of the respective burner elements, said inverted U-shaped member including a front leg and a rear leg, said front leg of said inverted U-shaped member extending downwardly contiguous to the plane of the ports and the edge of the front leg spaced slightly therefrom providing a transverse space between the plane of the ports and the edge of the front leg and extending longitudinally of the inverted U-shaped member, said rear leg of said inverted U-shaped members also extending downwardly substantially per-

pendicular to the plane of the ports and extending longitudinally of the inverted U-shaped member and operatively affixed to the manifold to accumulate a portion of the gas discharged from said end ports along the inverted U-shaped member, said burner elements being so spaced that upon ignition of such accumulated gas an ignition flame will extend along said inverted U-shaped member to the burner ports of other burner elements.

3. In a carry-over structure for gas burners, the combination of a burner structure including a manifold and a plurality of burner elements extending transversely therefrom, each element having a series of elongated burner ports therein, the ports of each series being positioned sufficiently close to one another that ignition of gas discharged from one port will cause ignition of gas discharged from the next adjacent port, each respective series of ports being spaced a substantial distance from the adjacent series of ports, a corresponding end port of each element being smaller in size than the remaining ports thereof, an elongated carry-over member comprising an inverted U-shaped portion positioned above and overlying said smaller end ports of the respective burner elements, said inverted U-shaped portion including a front leg and a rear leg, said front leg of said inverted U-shaped portion extending downwardly contiguous to the plane of the ports and the edge of the front leg spaced slightly therefrom providing a transverse space between the plane of the ports and the edge of the front leg and extending longitudinally of the inverted U-shaped portion, said rear leg of said inverted U-shaped portion also extending downwardly substantially perpendicular to the plane of the ports and extending longitudinally of the inverted U-shaped portion and operatively affixed to the manifold to accumulate gas discharged from said smaller end ports along the overlying portion of said members, said smaller end ports being so spaced that upon ignition of such accumulated gas an igniting flame will extend along said member to the burner ports of other burner elements.

4. In a carry-over structure for gas burners, the combination of a burner structure including a manifold and a plurality of burner elements extending transversely therefrom, said manifold being formed from sheet material and having a pair of longitudinally extending edges adjacent the top thereof, said edges terminating in generally parallel opposed flanges, one of said flanges being formed with grooves in the opposed face thereof with the intermediate portions of the flange secured to the opposed flange, said grooves forming a plurality of spaced gas ports, each element having a row of burner ports therein extending to adjacent the manifold, the ports of each row being positioned sufficiently close to one another that ignition of gas discharged from one port will cause ignition of gas discharged from the next adjacent port, the ports in said elements and in said manifold being substantially positioned in a common plane, each respective row of ports being spaced a substantial distance from the adjacent row of ports, a carry-over structure comprising a generally inverted U-shaped portion extending longitudinally along said manifold above and overlying the ports therein operative to receive gas discharging from said manifold ports and accumulate such gas along the member, and said inverted U-shaped portion including a front leg and a rear leg, said front leg of said inverted U-shaped portion extending downwardly contiguous to the plane of the ports and the edge of the front leg spaced slightly therefrom providing a transverse space between the plane of the ports and the edge of the front leg and extending longitudinally of the inverted U-shaped portion, said rear leg of said inverted U-shaped portion extending downwardly substantially perpendicular to the plane of the ports and extending longitudinally of the inverted U-shaped portion and operatively affixed to the manifold, whereby upon ignition of the gas accumulated along said U-shaped portion an ignition flame will extend therealong and ignite gas discharged by burner ports of other respective burner elements.

5. In a carry-over structure for gas burners, the combination of a burner structure including an elongated manifold and a plurality of burner elements extending transversely therefrom, each having a series of burner ports therein, the ports of each series being positioned sufficiently close to one another that ignition of gas discharged from one port will cause ignition of gas discharged from the next adjacent port, each respective series of ports being spaced a substantial distance from the adjacent series of ports, a detachably mounted carry-over structure extending from adjacent the ports of one burner element to the ports of an adjacent burner element, said carry-over structure including a member comprising a leg portion, and a horizontally arranged portion positioned to receive gas from the ports of the burner structure, said carry-over structure arranged for receiving and confining the gas from burner ports contiguous to the carry-over structure for ignition of gas discharged from the ports of the burner elements, said member having the horizontally arranged portion overlying the plane of the ports and the edge of the horizontally arranged portion spaced slightly from the plane of the ports providing a transverse space between the plane of the ports and the edge of the horizontally arranged portion and extending longitudinally of the horizontally arranged portion, said leg of the aforesaid member extending downwardly substantially perpendicular to the plane of the ports and extending longitudinally of the horizontally arranged portion of said member to restrain such gas along the member, the spacing of the ports from which gas is so restrained being such that upon ignition of such accumulated gas an igniting flame will extend along said member to the burner ports of adjacent burner elements, and securing means for detachably mounting the carry-over structure to the elongated manifold.

6. In a carry-over structure for gas burners, the combination of a burner structure including an elongated manifold and a plurality of tubular burner elements extending transversely therefrom, each having a series of burner ports therein, the ports of each series being positioned sufficiently close to one another that ignition of gas discharged from one port will cause ignition of gas discharged from the next adjacent port, each respective series of ports being spaced a substantial distance from the adjacent series of ports, said manifold comprising a semicircular sheet including longitudinally extending upper and lower oppositely arranged flanges at the diameter thereof, a flat sheet complementally formed to the peripheral outer longitudinally extending edges of the flanges and affixed thereto, said flat sheet provided with openings to which are affixed the tubular burner elements, said upper flange and upper edge of the flat sheet affixed thereto and arranged to provide spaced ports extending along the edge thereof and in operative relationship with the burner ports of the tubular burner elements to cause ignition of the gas discharged from the burner ports by carry-over of the ignition flame from the spaced ports extending along the upper edge of the manifold, a detachably mounted carry-over structure including a horizontally arranged portion positioned with respect to said ports of the tubular burner elements and longitudinally extending spaced ports of the manifold to receive gas therefrom, said horizontally arranged portion overlying the plane of the ports providing a transverse space between the plane of the ports and the edge of the horizontally arranged portion and extending longitudinally of the horizontally arranged portion, said carry-over structure also comprising a leg extending downwardly substantially perpendicular to the plane of the ports and extending longitudinally of and in operative relationship contiguous to the rear face of the upper flange of the manifold to restrain such gas from the ports of the manifold along said carry-over structure, the spacing of the

ports formed contiguous to the upper flange of the manifold from which gas is so restrained being such that upon ignition of such accumulated gas an igniting flame will extend along said member to the burner ports of adjacent burner elements, and securing means for detachably affixing the carry-over structure to the elongated manifold.

7. A gas burner structure comprising a hollow structure including a tubular burner manifold, a plurality of contiguously spaced and parallel burner tubes and burner ports extending longitudinally thereof, said burner tubes communicating with the tubular burner manifold, a carry-over structure for igniting gas discharged from laterally spaced burner ports of said contiguously positioned parallel spaced burner tubes, said carry-over structure extending longitudinally with respect to the tubular burner manifold and transverse to the burner tubes and positioned on the tubular burner manifold contiguous to the juncture of the burner tubes to the tubular burner manifold, said carry-over structure extending from one portion of the burner structure to another transversely to the longitudinal axis of the burner tube, whereby said ignition flame will travel along said carry-over structure from one portion of the burner structure to the other, igniting the gas discharged from the burner ports of the laterally spaced parallel burner tubes.

8. A gas burner structure comprising a hollow structure including a tubular burner manifold, a plurality of contiguously spaced and parallel burner tubes and burner ports extending longitudinally thereof and discharging upwardly from the burner tube, said burner tubes communicating with the tubular burner manifold, a carry-over structure for igniting gas discharge from laterally spaced burner ports of said contiguously positioned parallel spaced burner tubes, said carry-over structure extending longitudinally with respect to the tubular burner manifold and transverse to the burner tubes and positioned on the tubular burner manifold contiguous to the juncture of the burner tubes to the tubular burner manifold, said carry-over structure extending from one portion of the burner structure to another transversely to and contiguous to one end of the line of burner ports of contiguously spaced burner tubes, whereby said ignition flame will travel along said carry-over structure from one portion of the burner structure to the other, igniting the gas discharged from the burner ports of the laterally spaced parallel burner tubes.

9. A gas burner structure comprising a hollow structure including a tubular burner manifold, a plurality of contiguously spaced and parallel burner tubes and burner ports extending longitudinally thereof, said burner tubes communicating with the tubular burner manifold, a carry-over structure for igniting gas discharging from laterally spaced burner ports of said contiguously positioned parallel spaced burner tubes, said carry-over structure extending longitudinally with respect to the tubular burner manifold and transverse to the burner tubes and positioned on the tubular burner manifold contiguous to the juncture of the burner tubes to the tubular burner manifold, said carry-over structure extending from one portion of the burner structure to another transversely to the longitudinal axis of the burner tubes, said carry-over structure including a generally inverted U-shaped portion operatively mounted on the tubular burner manifold and extending longitudinally along said manifold above and overlying the end ports of the spaced burner tubes to receive gas discharging from said end ports and accumulate this gas along the inverted U-shaped portion, whereby upon ignition of the gas accumulating along said inverted U-shaped portion, an ignition flame will extend

therealong and ignite gas discharged by the end burner ports of the other spaced burner tubes.

10. A gas burner structure comprising a hollow structure including a tubular burner manifold having a longitudinally extending flange, a plurality of contiguously spaced and parallel burner tubes and burner ports extending longitudinally thereof, said burner tubes communicating with the tubular burner manifold, a carry-over structure for igniting gas discharging from laterally spaced burner ports of said contiguously positioned parallel spaced burner tubes, said flange arranged contiguous to the end ports of the spaced burner tubes, said carry-over structure extending longitudinally with respect to the tubular burner manifold and transverse to the burner tubes and positioned on the tubular burner manifold contiguous to the juncture of the burner tubes to the tubular burner manifold, said carry-over structure extending from one portion of the burner structure to another transversely to the longitudinal axis of the burner tubes, said carry-over structure extending longitudinally along said burner manifold contiguous to the end ports of the spaced burner tubes, and said carry-over structure operatively formed contiguously with the longitudinally extending flange and arranged adjacent the end ports of the spaced burner tubes.

11. A gas burner structure comprising a hollow structure including a tubular burner manifold having a longitudinally extending flange, a plurality of contiguously spaced and parallel burner tubes and burner ports extending longitudinally thereof, said burner tubes communicating with the tubular burner manifold, a carry-over structure for igniting gas discharging from laterally spaced burner ports of said contiguously positioned parallel spaced burner tubes, said flange arranged contiguous to the end ports of the spaced burner tubes, said carry-over structure extending longitudinally with respect to the tubular burner manifold and transverse to the burner tubes and positioned on the tubular burner manifold contiguous to the juncture of the burner tubes to the tubular burner manifold, said carry-over structure extending from one portion of the burner structure to another transversely to the longitudinal axis of the burner tubes, said carry-over structure extending longitudinally along said burner manifold contiguous to the end ports of the spaced burner tubes, and overlying the end ports of the spaced burner tubes to receive gas discharging from said end ports and accumulate this gas along the carry-over structure, and said carry-over structure operatively formed contiguously with the longitudinally extending flange and arranged adjacent the end ports of the spaced burner tubes.

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