Jan. 7, 1930. A. W. MACHLET ET AL 1,742,607

GAS BURNER

Filed Dec. 28, 1926 2 Sheets-Sheet 1

Fig. 1.

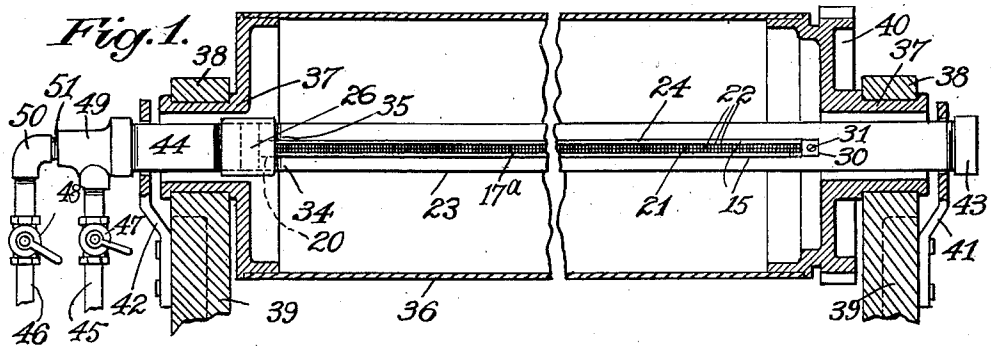


Fig. 4.

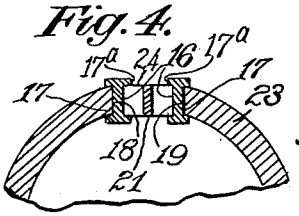
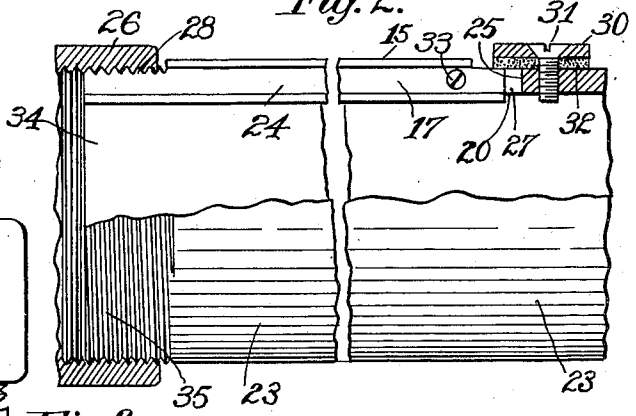


Fig. 2.



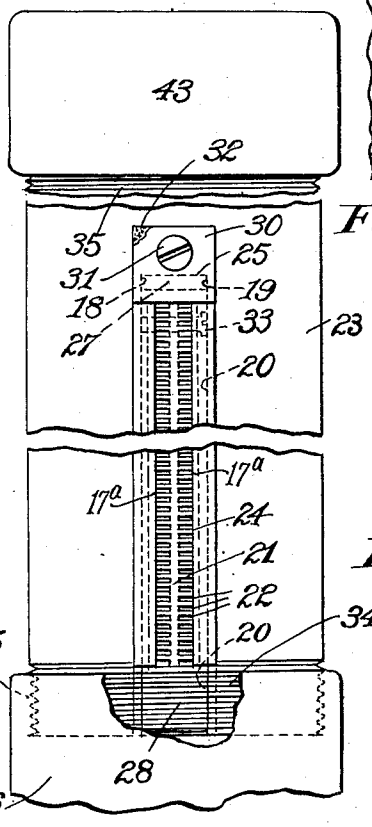


Fig. 3.

Fig. 5.

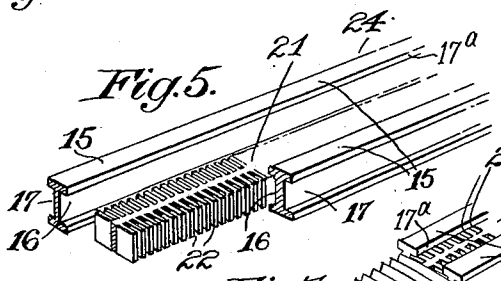


Fig. 7.

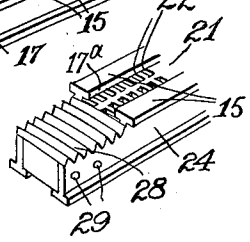
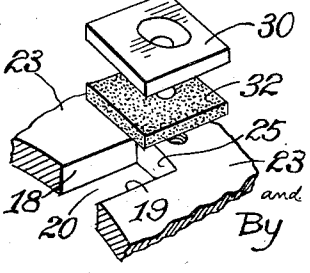


Fig. 6.



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GAS BURNER

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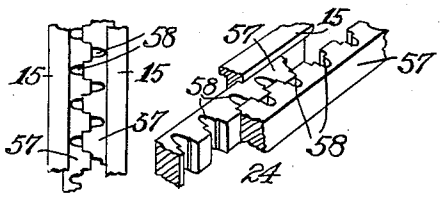


Fig. 8. Fig. 9.

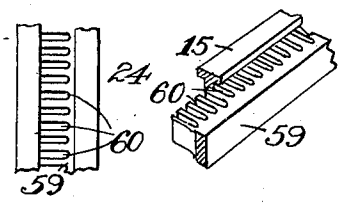


Fig. 10. Fig. 11.

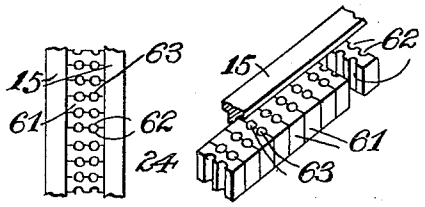


Fig. 12. Fig. 13.

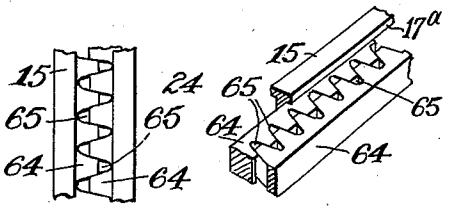


Fig. 14. Fig. 15.

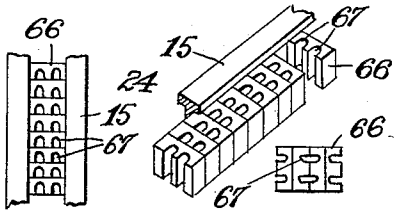


Fig. 16. Fig. 17.

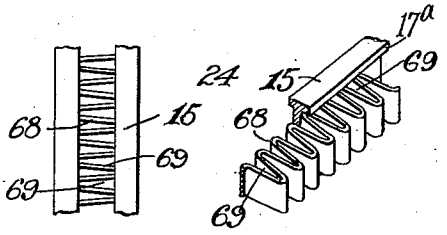


Fig. 18. Fig. 19.

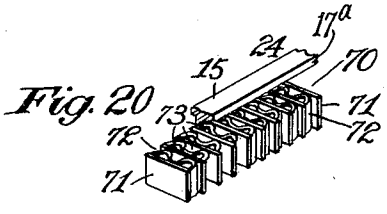


Fig. 20.

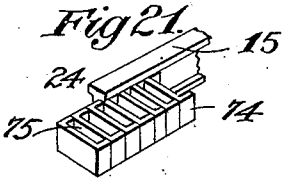


Fig 21.

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UNITED STATES PATENT OFFICE

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GAS BURNER

Application filed December 28, 1926. Serial No. 157,475.

This invention relates to gas-burners, particularly such burners as are used in the heating of work-cylinders, etc., wherein the burners have one or more long rows of closely-spaced perforations, to produce practically a continuous blue flame, by consuming mixed air and gas fed thereto.

Burners made by perforating a pipe are expensive, since the holes soon burn away unevenly, causing uneven flame. Where a pipe or a casting has an attached strip of comparatively thin metal with punched holes, the strip must necessarily be of such thinness (to be able to punch fine perforations therein) that when exposed to the heat it soon warps, due to expansion and contraction, and causes trouble, and burns unevenly and unsatisfactorily.

According to the present invention, the usual burner-pipe, having a row of perforations throughout its length, is replaced by a pipe slotted for its whole length, the slot extending through the wall. In this slot is articulated a burner. In the preferred form of the invention, the burner includes three strips or bars extending the length of said pipe-slot; one of said bars having burner-perforations throughout its length, and the other two bars forming opposite anchorages or seats for said perforated burner-portion. The seat-parts are preferably in the shape of bars of I-section; or, in other words, each of said seat-bars has upper and lower flanges which catch over the edges of the slot in the pipe, forming anchorages, and they also have upper and lower inner flanges which catch over and under the middle or perforated bar, the latter thus forming a key, whereby the three members tightly interlock or articulate with one another and with the edges of the slot in the pipe. The body of the perforated key-bar fills the gap between the I-members, and holds them onto the pipe. The inner flanges prevent the perforated bar from rising or falling. In assembling the parts they may be slidden endwise into the slot in the pipe, and there retained by any suitable means. At its outer end the fuel-pipe may be threaded, and corresponding threads may be finally formed in the three burner-members, permitting a cap or coupling to be screwed upon the end of the pipe and thereby hold the same.

It will be seen that warping of the perforated central bar or key is prevented. The device is simple to make and easily applied and extremely durable. The perforations in the central bar may be formed by notching or sawing teeth in the edges of the bar; the notches being capped or partly covered by the inner flanges of the I-members.

The burner-portion may expand and contract lengthwise, and does not warp. Provision is made to close the gap which accommodates the expansion and contraction. The perforations or orifices are inexpensive, and the invention produces a highly efficient and reliable burner wherein the walls of the perforated members may be of any desirable height and spacing, and the life of the burner is greatly prolonged.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a plan view of our improved burner shown mounted for use in connection with a revolving cylinder, the cylinder being in section.

Figure 2 is a fragmentary view on an enlarged scale showing both extreme end-portions of the laminated burner-member with relation to its mounting in the body of the structure.

Figure 3 is a plan view of the burner, parts broken away to more clearly show the construction.

Figure 4 is a fragmentary view in cross-section of the burner.

Figure 5 is a perspective view of the laminated members, shown separated to more clearly disclose the construction.

Figure 6 is a perspective view of a closure-means at the end of the slide.

Figure 7 is a perspective view of the fixed end of the slide.

Figures 8 to 21, inclusive, show various forms of the perforated members.

The preferred form of the burner includes a pair of rails or bars 15 having longitudinal grooves at both sides thereof, as 16 and

17, forming overhanging edges, or flanges. The outside grooves 17 conform to the walls 18 and 19 of the slot 20 in the pipe, while the inside grooves 16 enclose in a similar manner any form of perforated filler, which may be either a single bar or formed in multiple. Preferably a single bar has suitable edge slits cut therein to form gas-jets.

In the form shown in Figures 1 to 7, a single key-bar or strip 21, rectangular in form, has such width and height as to fit tightly within the grooves 16 of the side bars or anchorages. Each side of the key-bar may have slits 22 formed therein to serve as gas-jets. The use of a slitted bar of comparative thickness insures a longer life to the burner and the perforations are easily slitted, with regularity and uniformity of spacing, resulting in an even flame along the entire burner. The burner pipe 23 has a slot 20 formed therein to receive the built-up burner 24 with its overhanging flanges, which are slidden into place. The pipe-slot has edges along both sides to fit between the flanges of the burner 24, by insertion of the latter from the open end of said slot. Interlocking of the parts is effected in all directions except longitudinal. Any other form of burner-body may be used, wherein an open slot may be formed. The slot 20 may be of any desired width and extending lengthwise of the pipe. It has side walls or edges 18 and 19, and an end wall 25. The outer and inner surfaces of the pipe along the slot are embraced by the flanges of the burner-member 24.

The burner-member 24 being built up, may be readily renewed in part or entirely, and may be readily slipped as a unit into the slot by inserting the same from the open end of the pipe, before attaching the supply end with its coupling member 26.

The slot 20 wherein the burner 24 is located, is somewhat lengthened to permit lengthwise expansion and contraction of the burner, a gap 27 occurring at the forward end of the burner, Figure 2. The burner is held fixed to one end of the pipe 23 by the coupling 26.

This end of the burner unit is threaded, as at 28. This thread may be formed after the burner-members have been joined together by rivets or pins 29. The coupling 26, the burner with its threads 28, and pipe 23, are all fixed at this end. This end of the burner may be left in uncut condition when inserted in the slot, but the burner-end may be reduced until it forms a mere filler of the end of the slot in the pipe, with the reduced portion of the burner unit flush with the outer surface of the pipe. The burner being then fastened, the threads may be cut at one operation, partly in the burner end as at 28 but mainly in the pipe end at 34. Then a cap or coupling screwed onto the threaded end 35 will serve to fasten the burner unit as well as to close the pipe or connect it to a supply pipe.

To close the gap 27 at the other end of the burner, a cover-plate 30 is held by a screw 31 threaded into the pipe, providing a tight joint with the pipe. A lining 32, preferably of asbestos, may be interposed between the plate and pipe. The burner-member parts at this free end may be held together by a screw 33 to make it convenient to handle the burner when out of the slot.

The burner pipe is mounted in any desirable manner, as for instance within a cylinder 36, the end bearings 37 of which are hung in journals 38 of a frame 39. The cylinder may be revolved by gear 40.

The bearings 37 are hollow for the reception of the stationary burner-pipe 23, which may extend entirely through the cylinder and may be supported by brackets 41 and 42. The burner includes the pipe 23 closed at one end by a cap 43. At the other end of pipe 23 the coupling member 26 is threaded to join with the end of pipe 23, which is also threaded as at 34. The coupling on its outer end is provided with a short section of pipe 44, reaching out of the bearing 37 and hung in the bracket 42. Supporting this end of the burner structure, the pipe 23 may reach out to clear the side frame of the machine, and here be provided with any suitable valves for an air and gas mixture. Two inlet pipes 45 and 46 are provided with valves 47 and 48, to control the supply. The air pipe 45 is threaded to a fitting 49, one end of which is threaded and joins with the outer end of the pipe-section 44, and the pipe 46 has an elbow 50 that joins at the end of the fitting, as at 51.

Various forms of multiple jets may be used. In Figures 8 and 9, we show a face and perspective view of a two-part key or jet strip, in which the members 57 are of like construction, having cuts on their inner walls of such proportion as to produce gas-jets 58 and provide for a wide-spacing thereof. The cuts are further provided with shoulders to prevent collapse between the side or anchorage rails.

In Figures 10 and 11, a single jet-strip 59 has cuts 60 extending nearly across the face of the strip thereby forming elongated jets, permitting comparatively close spacing.

In Figures 12 and 13, the jet-strips 61 are of cross pieces, of proportions to fit within the side rails, each piece having partly-formed recesses 62 which are opposed, and co-operate with each other to form full openings or gas jets 63, forming a double row of evenly-spaced perforations.

In Figures 14 and 15, a pair of jet-members 64 have cuts 65 therein forming teeth and spaces that match, the cuts having taper walls. This prevents full contact, thus forming openings at the front of the teeth and bottoms of the spaces.

In Figures 16 and 17, cross pieces 66 have recesses 67 at one side only. The members may be turned back to back, and two kinds of spacing obtained.

In Figures 18 and 19 we show a form of corrugated strip or band forming a jet-strip 68, which may be bent to produce large or small openings 69, as the case may require. This is possible in this construction since the forcing together or separation of the folds will not increase or decrease the width of the strip but will vary the spacing of the jets.

In Figure 20, a jet-strip 70 includes cross bars formed of flat pieces 71 and corrugated spacers 72. These members, when nested together as shown, form a series of jets or orifices 73 of uniform spacing.

In Figure 21 is shown a jet-strip 74 built up of bent cross pieces abutting one another to form elongated apertures 75 crosswise of the burner.

The parts are removable and the members capable of being produced at a low cost by standard methods of production. The life of the burner is materially extended, due to the proportioning of the jets and the yielding of the members to one another under the heating and cooling strains.

The invention is not limited to having the threads 28 at one end, since the pipe 23 may be threaded at both ends as at 34, and the burner-members may at each end be correspondingly threaded as at 28. The lower part of Figure 3 may be regarded as showing each end of a burner and pipe. Or both ends may be constructed and supported as shown at upper part of Figure 3, by means of parts 30, 31, etc., thus permitting longitudinal expansion of the burner member or members at both ends.

The inner overhanging flange portions 17a, at the outer side of the burner, form opposing burner-lips, which direct the flames compactly upward, which is an advantage.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described our invention, we claim:

1. In a gas burner, a casing therefor provided with an open channel the greater part of its length, means slidable into said channel from one end thereof including a pair of side members having overhanging edges adapted to lie over the top and lower surfaces of the walls of the channel, an intermediate bar between the side members also held in place by overhanging edges of the side members, said bar being provided with slits on both sides thereof, thereby forming communicating ports from the interior to the exterior of the casing when said bar is in position in the casing, means at one end of the casing to close the same, and means at its opposite end to supply gas and air in regulated proportion to the burner.

2. In a gas burner, a casing therefor provided with an open channel the greater part of its length, means slidable into said channel from one end thereof, including a pair of side members having overhanging edges adapted to lie over the top and lower surfaces of the walls of the channel, a filler-strip between the side members also held in place by overhanging edges of the side members, the strip having slits in spaced relation along its edges forming ports when in position in the casing leading from inside to the exterior thereof, means to close the casing at one end, and means at the opposite end to supply gas and air in regulated proportion.

3. In a gas burner, a casing therefor provided with an open cut, means adapted to fit within the cut, including a pair of side supports enclosing a filler-member held in position by flanges extending from the sides of the supports to hold both the side supports and filler-member in position in the casing, the filler-member including a plurality of sections, each provided with recesses, said recesses forming jets to have communication from the interior to the exterior of the casing, and means at one end of the casing to close the same and at its opposite end provided with a supply inlet to feed gas and air in regulatable proportions.

4. A gas burner, consisting of a straight supply tube, provided with a closure cap at one end, an open channel in the tube extending from its open end to approximately its other end, and means having side rails and provided to slidably fit within the channel, said means including gas orifices formed by sectional members held between the side rails, the latter having overhanging edges to both hold the means assembled and within the channel.

5. A gas burner including a body-portion of a straight pipe-like formation, having a closure cap at one end and a channel in axial alignment with the body extending from the open end the greater part of its length, and means having flanged side members provided to slidably fit within the channel, said means including sectional members with gas-jets in the form of recesses therein and held in position by the flanged side members, the flanged side members further locking the assembled parts within the channel.

6. A gas burner, in combination, a body-portion consisting of a member of extended tubular formation having an open channel therein reaching from one end to approximately the other end thereof, a burner-member slidable into the channel from the open end of the channel, including a pair of guide rails having overhanging edges to hold the burner-member within the channel, a center portion of built-up sections which

form perforations within the guide rails, said center portion being supported by said guide rails, means to hold the burner-member fixed to one end of the body-portion, said means also carrying the gas and air supply, and means to close an expansion and contraction gap between the channel and burner-member.

7. A gas burner having a body-portion closed at one end, and having a gas and air inlet at its other end, a removable burner-member located in a channel of the body-portion, including a pair of side bars having means to interlock with the edges of said channel and enclosing between them a foraminous center strip, one end of said burner-member being fixed to the body-portion, and a closure plate to close an expansion and contraction gap at its free end, each of said side bars having grooved edges interlocking with the associated edges of the channel of said body-portion, and with the center strip.

8. A gas burner, in combination with a body-portion closed at one end, and having a gas and air inlet at its other end, a removable burner-member located in a channel of the body-portion, including a pair of side bars enclosing a two-part center strip of like formation having alternately-disposed recesses and projections interlocking with each other, forming gas orifices at their ends, one end of said burner-member being fixed to the body-portion, and a closure-plate to close an expansion and contraction gap at its free end.

9. In a gas burner, in combination with a casing, a slot in the casing, a flanged burner-portion slidable into said slot from one end thereof, means to hold the burner-portion within the slot of the casing in all directions except its entrance, and means to lock the burner-portion at the entrance end after the full insertion of said burner-portion into the slot.

10. In a gas burner, in combination with a slotted casing, a perforated burner-portion slidable into the slot of the casing, said burner-portion provided with flanges to engage the walls of the slot by means of which it is held to the casing in all directions except its entrance into the slot from one end, and means to hold it fixed to said end of the slot.

11. In a gas burner, in combination with a casing, a slot in the casing for the reception of a burner-portion, including a pair of flanged side bars of I-section, means between the side bars having oppositely-disposed cuts formed therein, providing passages from the interior to the exterior of the casing, the flanges of said side bars overlapping the burner-means at their inner sides, and on the outer sides overlapping the walls of the slot and being held thereto, means to hold the burner-portion fixed to one end of the slot, and means to close the opposite end of the slot and burner-member.

12. In a gas burner, in combination, a tubular casing having a slot along the length thereof, and a burner-portion slidable into said slot, including a pair of side bars each provided with oppositely-disposed flanges at the top and bottom thereof, the outer flanges of the bars engaging and overlapping the walls of the slot of the casing, and the inner flanges supporting recessed members to provide jets communicating from the interior to the exterior of the casing.

13. In a gas burner, in combination, a tubular casing having a slot along the length thereof, a burner-portion slidable into said slot, including a pair of side bars each provided with oppositely-disposed flanges at the top and bottom thereof, the outer flanges of the bars engaging and overlapping the walls of the slot of the casing, and the inner flanges supporting recessed members to provide jets communicating from the interior to the exterior of the casing, a closure at one end of the casing and a supply port at the other, means betweeen said ends to hold the burner-portion fixed at one end, and means to close a gap formed at the other end of the slot and burner-portion.

14. In a gas burner, in combination, a slotted tubular casing, and a burner-portion having a slidable connection with said slotted casing, including flanged side bars, the inner flanges of which overlap the top and bottom portions of a notched bar held between said side bars, thereby capping or closing the outer ends of said notches, the outer top and bottom flanges engaging with the walls of the slotted casing, thereby locking the burner-portion with the notched bar to the casing in all directions except its entrance and withdrawal from the end of said casing.

15. A gas burner including a pipe having a longitudinal slot, bars having channels supporting them upon the edges of said slot, and a foraminous bar caught between said channel-bars, each of said channel-bars having channels on its opposite sides, said foraminous bar fitting into and being supported within said inner channels, and the outer channels fitting over the edges of the slot in the pipe, forming supports for the bars.

16. A gas burner including a pipe having a longitudinal slot, bars having channels supporting them upon the edges of said slot, and a foraminous bar caught between said channel-bars, each of said channel-bars having channels on its opposite sides, the inner channels supporting said foraminous bar and the outer channels fitting over the edges of the slot in the pipe, the inner top flanges serving as burner-lips to direct the flames upward.

17. A gas burner including a pipe having a longitudinal slot, bars having channels supporting them upon the edges of said slot, a

foraminous bar caught between said channel-bars, each of said channel-bars having channels on its opposite sides, the inner channels supporting said foraminous bar and the outer channels fitting over the edges of the slot in the pipe, and end-attaching means for the bars.

18. A gas burner including a pipe having a longitudinal slot, bars having channels supporting them upon the edges of said slot, a foraminous bar caught between said channel-bars, each of said channel-bars having channels on its opposite sides, the inner channels supporting said foraminous bar and the outer channels fitting over the edges of the slot in the pipe, and end-attaching means for the bars, said end-attaching means having provision for relative endwise expansion of the members.

19. A gas burner including a pipe having a longitudinal slot, bars having channels supporting them upon the edges of said slot, and a foraminous bar caught between said channel-bars, said foraminous bar being provided with notches in its edges, which are enclosed in the channels in the side bars, leaving the burner-perforations exposed between said side bars.

20. A gas burner including a longitudinally-slotted pipe and a burner articulated therein and having a row of gas-jets, said burner in the form of a bar-member having exterior channels in which fit the edges of the slot in the pipe, said burner having three bars, the outer ones channeled to fit upon the edges of the slot in the pipe, and the inner bar anchored within said outer ones and having burner-perforations.

21. A gas burner including a longitudinally-slotted pipe and a burner articulated therein and having a row of gas-jets, said burner in the form of a bar-member having exterior channels in which fit the edges of the slot in the pipe, said burner having three bars, the outer ones channeled to fit upon the edges of the slot in the pipe, and the inner bar anchored within said outer ones and having burner-perforations, said outer bars each having I-section and each having upper and lower outer flanges catching over the edges of the slot in the pipe, and also having upper and lower inner flanges catching over and under the inner bar.

22. A gas burner including a longitudinally-slotted pipe and a burner articulated therein and having a row of gas-jets, said burner in the form of a bar-member having exterior channels in which fit the edges of the slot in the pipe, said burner having three bars, the outer ones channeled to fit upon the edges of the slot in the pipe, and the inner bar anchored within said outer ones and having burner-perforations, said outer bars each having I-section and each having upper and lower outer flanges catching over the edges of the slot in the pipe, and also having upper and lower inner flanges catching over and under the inner bar, the upper inner flanges forming burner-lips.

23. A gas burner including a longitudinally-slotted pipe and a burner articulated therein and having a row of gas-jets, said burner in the form of a bar-member having exterior channels in which fit the edges of the slot in the pipe, said burner having three bars, the outer ones channeled to fit upon the edges of the slot in the pipe, and the inner bar anchored within said outer ones and having burner-perforations, said outer bars each having I-section and each having upper and lower outer flanges catching over the edges of the slot in the pipe, and also having upper and lower inner flanges catching over and under the inner bar, said three members tightly interlocking or articulating with one another and with the edges of the slot in the pipe.

24. A gas burner including a longitudinally-slotted pipe and a burner articulated therein and having a row of gas-jets, said burner in the form of a bar-member having exterior channels in which fit the edges of the slot in the pipe, said burner having three bars, the outer ones channeled to fit upon the edges of the slot in the pipe, and the inner bar anchored within said outer ones and having burner-perforations, said outer bars each having I-section and each having upper and lower outer flanges catching over the edges of the slot in the pipe, and also having upper and lower inner flanges catching over and under the inner bar, the body of the inner bar filling the gap between the outer bars and holding them onto the pipe.

25. A gas burner including a pipe having a longitudinal slot, bars having side channels extending the length thereof and fitting over the opposite edges of said slot to support the bars, and a foraminous bar caught between said channel bars.

26. A gas burner including a longitudinally-slotted pipe and a burner extending the length of the slot therein and having a row of gas-jets, said burner and pipe interlocked by means of side flanges forming articulations throughout the length of the burner, said burner in the form of a bar-member having exterior channels which are formed by the flanges, and in which fit the edges of the slot in the pipe.

27. In a gas-burner, the combination of a slotted pipe, a supporting means mounted in the slot in the pipe and extending for the length of the slot, said supporting means having supporting flanges which overhang the opposite top and bottom edges of the slot in the pipe, and also having inwardly-directed flanges, and a foraminous member supported by and between said inwardly-directed flanges.

28. In a gas-burner, the combination of a slotted pipe, supporting means mounted in and extending the length of the slot in the pipe, said supporting means including portions each of which has upon its opposite sides longitudinal channels forming upper and lower flanges, including outer flanges which engage the sides of the slot in the pipe and interlock therewith, and also including inner flanges, and a perforated burner-jet-portion supported by and between the inner flanges.

29. The combination of a longitudinally slotted pipe, a device within the slot and extending the length thereof and having a row of gas-jets, and means for supporting said gas-jet device in position, said supporting means having flanges overhanging and underlying the edges of the slot in the pipe throughout the length of the slot.

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