

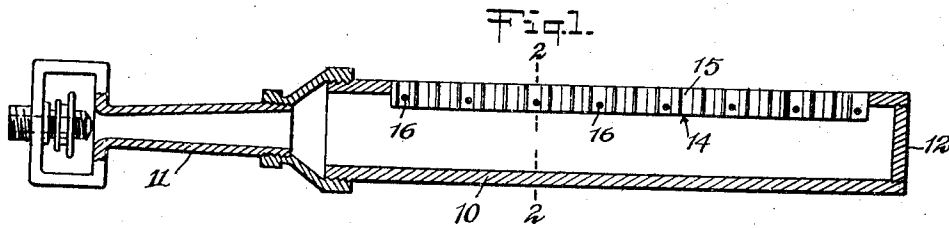
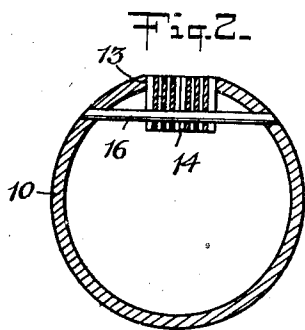
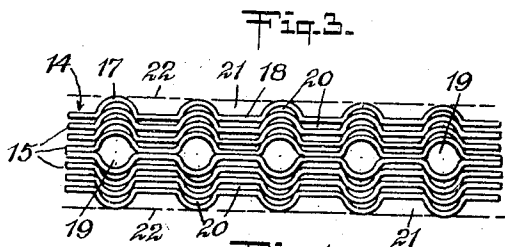
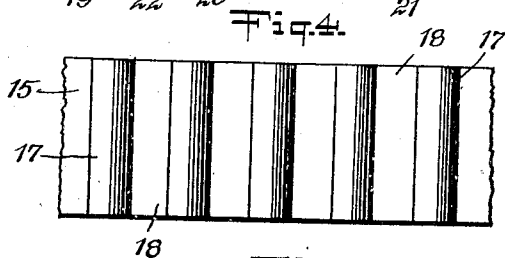
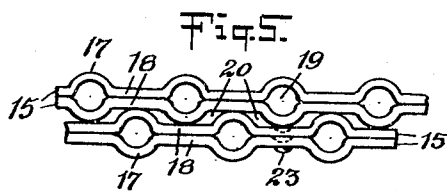
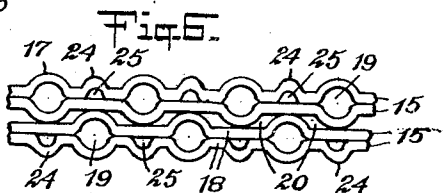
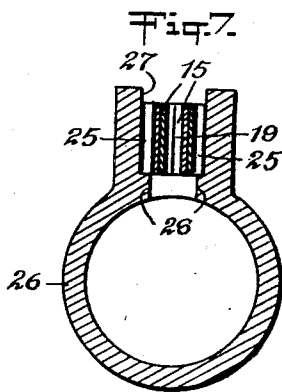
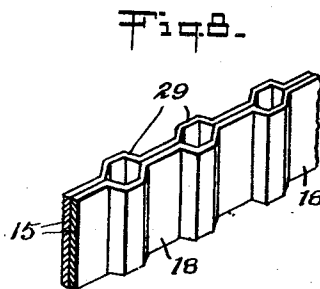
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2,443,101

RIBBON BURNER

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RIBBON BURNER

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5 Claims. (Cl. 158-116)

1

This invention relates to a ribbon type gaseous fuel burner.

An object of the invention is the provision of a burner of the indicated character which provides a multiplicity of individual cone type flames closely spaced, and piloting flames to maintain the cone flames burning with the gaseous fuel under high pressure and high velocity to give unusually high temperature.

A further object of the invention is the provision of a ribbon construction and arrangement for a gaseous fuel burner providing ports for propagating main heating flames, and piloting flames to keep the main flames burning, and wherein the ribbons restrict the flow of fuel in such a way that fuel pressure and velocity for the main flames are increased, while the fuel to the piloting ports is slowed down to a low velocity and steady piloting flame propagation, to the end that the burner will be of increased capacity and thermal efficiency.

With the foregoing principal objects, other objects of the invention will appear from the embodiments of the invention, which, by way of example, are described in the following specification and illustrated in the accompanying drawing, in which—

Fig. 1 is a central longitudinal sectional view of a burner embodying the features of the invention.

Fig. 2 is an enlarged transverse sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary plan view on an enlarged scale showing the construction and arrangement of ribbons providing the main heating flame ports and the piloting flame ports.

Fig. 4 is a side view of a portion of one of the ribbons shown in Fig. 3.

Fig. 5 is a fragmentary plan view showing the construction and arrangement of a modified form of ribbon.

Fig. 6 is a view similar to Fig. 5, but showing a further modified form of ribbon.

Fig. 7 is a transverse sectional view through a modified form of burner tube with ribbons of the type shown in Fig. 5.

Fig. 8 is a fragmentary perspective view of a pair of ribbons embodying further slight modifications.

Referring now to Fig. 1 it will be seen the burner includes a tube 10 of suitable length and diameter. The tube is adapted to receive a combustible mixture of air and gaseous fuel which is fed into one end of the tube by an inspirator 11. The other end of the tube is closed, as at

2

12. The tube has a slot 13 extending longitudinally therein between its ends. Arranged in the slot 13 is port structure 14 composed of strip material or ribbons 15 of similar construction. The structure 14 is attached to the tube 10 projecting into the slot 13 and supported by pins 16 which extend through the wall of the tube and the ribbons as shown in Figs. 1 and 2.

Each of the ribbons 15 consists of a strip of chromium steel crimped or corrugated at equidistantly spaced points to provide equal substantially semi-circular portions 17 and equal straight portions 18 between the portions 17. The construction of each ribbon 15 is such that a suitable number of them may be arranged in side-by-side relation to provide a port structure affording interspersed main ports and smaller piloting ports.

On reference to Fig. 3, it will be seen two of the ribbons are arranged reversely to each other side-by-side with the portions 17 of one ribbon directly opposite those of the other ribbon, and the portions 18 of one ribbon directly opposite those of the other ribbon. This provides a series of main ports 19 in a row extending longitudinally. The ports 19 are spaced from each other to produce individual jet or cone flames. Additional ribbons 15 are arranged in interlocking and nested relation at each side of the two reversely arranged ribbons aforesaid. The additional ribbons are side-by-side each in the same way, so that curved portions 17 are received in each other in seriatim. This provides a multiplicity of smaller volume piloting ports 20, as well as additional main ports 21. The ports 21 occur by reason of the contact of the portions 17 of the outermost ribbons with the walls of the slots 13, such walls being indicated by the dot-and-dash lines and designated 22 in Fig. 3. The ports 19 and 21 produce individual jet or cone flames, the flame propagation of the ports 19 and 21 resulting from high pressure and increased velocity. The ports 20 produce steady low pressure and low velocity piloting flames for the main flames, so as to keep the latter burning as long as the combustible mixture is fed into the tube 10.

It has been discovered that the ribbons 15 constructed and arranged in the manner shown and described provide a means whereby the pressure of the gaseous fuel fed to the burner tube 10 may be increased. This causes the fuel to flow through the larger main ports 19 and 21 with increased velocity and an accelerated rate of flame propagation. This maximizes the capacity and thermal

3

efficiency of the burner. Also, the fuel is caused to flow at a reduced velocity through the ports 20. The increased flow induced in ports 19 and 21 are kept ignited by the flow of fuel to ports 20 propagated piloting flames which keep the main heating flame burning and so prevent blow-off and explosions. The piloting flames are effectually grouped for the intended purpose. The depth of the ports can be controlled by increasing or decreasing the width of the ribbons. Also, the pressure and velocity of the gaseous fuel may be varied by changing the number of ribbons used.

As shown in Fig. 5, the ribbons 15 may be paired reversely to each other, and the pairs arranged side-by-side with the corrugations 17 in contact with the straight portions 18 of adjacent ribbons, to provide the main ports 19 and piloting ports 20. To prevent endwise movement of the ribbons with respect to each other there are indentations in one side of each ribbon and corresponding raised protuberances 23 receivable in the indentations.

In Fig. 6 there is shown another modification of the ribbon 15 wherein there are provided small crimps or corrugations 24 in the portions 18 between the portions 17. An arrangement of ribbons having the crimps 24 in addition to the crimps 17, provide piloting ports 25 in longitudinal rows along each row of main flame ports 19 on the outsides thereof in lieu of some of the ports 21.

In Fig. 7 there is shown a modified burner tubular body 26 having a machined slot 27 and longitudinal ledges or steps 28. Ribbons 15 of the type shown in Fig. 6 are arranged in the slot 27 and rest on the steps 28, to constitute a port structure for the main cone flames and piloting flames.

In Fig. 8 there is shown a further modified form of ribbon 15 in which semi-hexagonal portions 29 are provided in lieu of the semi-circular portions 17. A suitable number of ribbons having the portions 29 may be assembled in the manner shown in Fig. 3 to provide a substantially similar spacing of the main and piloting ports both lengthwise and crosswise to meet different requirements.

We claim:

1. A burner comprising a tube adapted to receive a gaseous fuel, said tube having a longitudinal slot communicating with the interior of the tube, and strip material in the slot which is corrugated at intervals, some of said corrugations reversely arranged side by side to provide series of main ports capable of propagating series of high velocity individual heating flames, and other

4

corrugations nested to provide series of smaller ports capable of propagating series of low velocity piloting flames for the main flames.

2. A burner as set forth in claim 1, wherein said strip material consists of separate strips each of which has alternate straight portions and corrugations.

3. A burner as set forth in claim 1, wherein said strip material consists of separate ribbons, and each ribbon has equal straight portions between the corrugations, said corrugations themselves being equal to each other.

4. A burner comprising a tube adapted to receive a gaseous fuel, said tube having a longitudinal slot therein communicating with the interior of the tube, and a port structure within the slot extending throughout the entire length thereof, said structure consisting of metal ribbons each of which is formed to embody equal straight portions intervening equal corrugations, said ribbons being disposed side-by-side, certain of the ribbons being arranged reversely with respect to each other so that their straight portions contact each other and the corrugations are directly opposite each other, and other ribbons being arranged so that their corrugations are interlocked and the straight portions are spaced, to thereby provide interspersed main flame ports and smaller piloting flame ports.

5. A burner comprising a hollow body adapted to receive a gaseous fuel, said body having a longitudinal slot communicating with the interior of the body, and metal strips in said slot, said strips being corrugated at intervals, some of said strips paired side by side with their corrugations reversed and registered in pairs forming main ports capable of propagating high velocity individual heating flames, and other strips arranged side by side with their corrugations nested in groups forming smaller ports capable of propagating low velocity piloting flames for the main flames.

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