C. W. STINE.

GASEOUS FUEL BURNER.

APPLICATION FILED DEC. 26, 1919.

1,372,724. Patented Mar. 29, 1921.

FIG. 1.

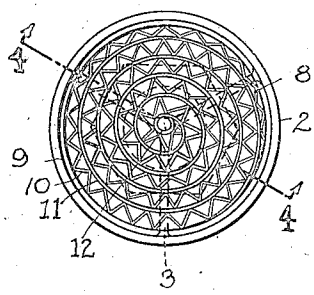


FIG. 3.

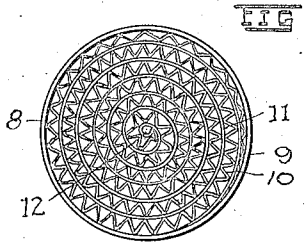


FIG. 2.

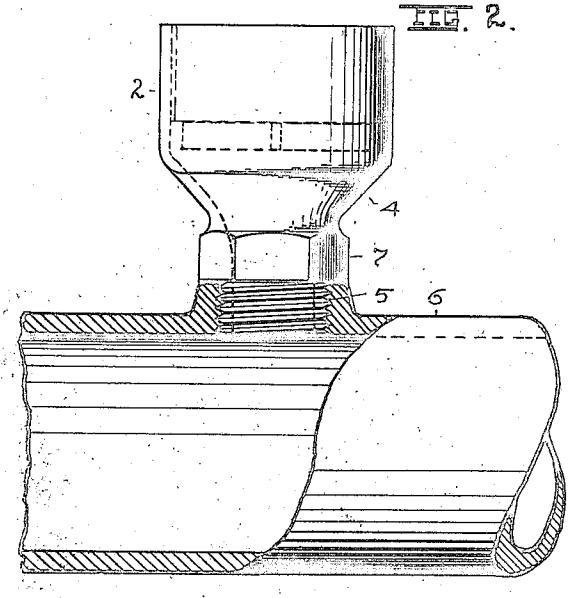


FIG. 4.

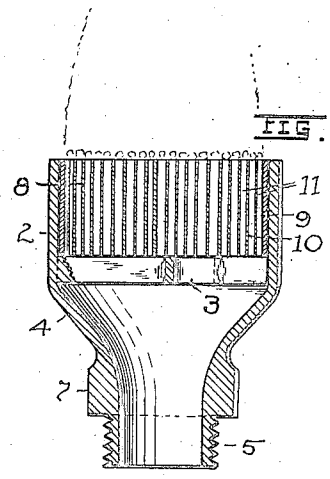


FIG. 5.

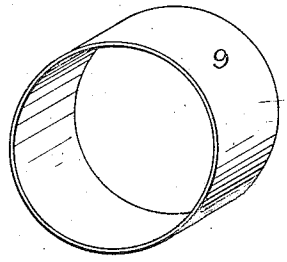


FIG. 6.

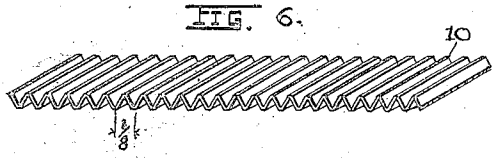
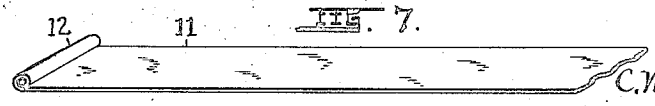


FIG. 7.



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UNITED STATES PATENT OFFICE.

CHARLES W. STINE, OF CLEVELAND, OHIO, ASSIGNOR TO THE CLEVELAND GAS BURNER & APPLIANCE CO., OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

GASEOUS-FUEL BURNER.

1,372,724. Specification of Letters Patent. Patented Mar. 29, 1921.

Application filed December 26, 1919. Serial No. 347,266.

To all whom it may concern:

Be it known that I, CHARLES W. STINE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Gaseous-Fuel Burners, of which the following is a specification.

This invention relates to an improvement in gaseous-fuel burners, and the object of the invention is to provide a burner of multitubular formation adapted to be produced in a simple and inexpensive way and which will operate efficiently and be durable and lasting in use, and positively prevent back firing.

Primarily, this burner is intended for stoves, ovens and furnaces used for domestic purposes, but the invention is not necessarily restricted to such appliances. However, as the requirements are exacting in burners used for domestic purposes the purpose is to fulfil such requirements with a burner which is adapted to use heavy hydrocarbon oils, scaling for instance from Baumé 27° upward. The burner is also constructed in a particular way so that the gaseous-fuel in passing through the burner is divided into a multitude of long fine parallel streams flowing closely adjacent to each other, and so that a small bead or globe of green flame exists constantly at the immediate discharge end or mouth of each passage while above these beads a vari-colored conical column of flame of considerable length is produced in which all the by-products of combustion are consumed. In other words, each small passage gives separate ignition at its head of a part of the escaping vapors, and the remainder immediately combines over the comb of passages to form a solid elongated column of flame tapering to a point, whereby all the vapor and by-products of combustion are consumed. Further, the multitude of long small parallel passages absolutely prevent back-firing under all pressures and mixtures, and the flame will not blow or lift off the seat of the burner under high pressures.

In the drawing accompanying this application, Figure 1 is a top plan view of the burner complete, and Fig. 2 is a side elevation thereof attached to a supply pipe or header. Fig. 3 is a top plan view of the removable core of the burner as it appears removed from the burner bowl. Fig. 4 is a vertical section through a complete burner. Fig. 5 is a perspective view of the band or ring within which the corrugated and plain strips are confined when coiled. Figs. 6 and 7 are perspective views of short pieces of the corrugated and plain strips of thin metal used in the burner.

The burner comprises a bowl or receptacle 2 which is shown in the drawings as round and cylindrical with a spider or grid 3 cast integral with the walls at the base of the enlarged chamber within the head of the bowl, and the lower portion of this bowl member is considerably reduced in diameter and connected with the enlarged portion by flaring walls 4. The lower reduced extremity 5 is also preferably screw-threaded externally so that convenient attachment and detachment may be made with a header or supply pipe 6 for the gaseous fuel. Annular wrench engaging faces 7 are also provided on the neck portion of this bowl member to facilitate its attachment and removal from the header or pipe 6. Preferably this bowl member is circular in cross section, but it might be square, hexagonal, of elongated form, or of other shape in cross section.

The upper chamber of bowl 2 and above grid 3 is also preferably circular or of the same shape or outline of the bowl, and a removable plug or core member 8 is snugly seated upon grid 3 within and engaged with the walls of the bowl. As shown this plug or core member comprises an endless metal band or ring 9 within which a strip of corrugated thin sheet metal 10 and a plain flat strip 11 of thin sheet metal are tightly coiled in facial contact to provide a multitubular body through which a multitude of fine attenuated streams of gaseous fluid is adapted to pass upwardly and issue separately at the top of the burner bowl over the entire area within the confining walls thereof.

In constructing the burner, a flat strip of thin metal of the proper width and length, say ¾ of an inch, is passed between the corrugated rolls to produce alternate ribs and grooves on opposite sides of the strip and a strip so formed of relatively thin gage having ribs approximately one-eighth of an inch apart have been found to give very

satisfactory results. One end of the plain flat strip 11 is first curled into a small round roll 12 and then the corrugated strip is placed on the flat strip and the two strips wound spirally and tightly into as many folds as may be required to the proper diameter to completely fill ring 9 when placed therein, substantially as shown in Fig. 3. This plug member is then introduced in the bowl and the burner is ready for use.

A burner constructed according to my invention creates a volume of flame capable of consuming all the by-products of combustion even though heavy oils are used, from which the vapor is derived. There is no back-firing notwithstanding that the aggregate of open areas at the burner surface is extensive and large; there is also an absence of back-pressure such as a wire gauze often creates where introduced in the vapor passage to prevent back-firing; the strip used being of brass or non-corrodible metal, no change takes place in the size of the minute passages and as such passages are kept clean and free from corrosive deposits the burner has a long life; the walls between the adjacent passages being relatively thin the heat from the flame acts thereon in a way which appears to have some beneficial effect in burning operations and preventing the flame from passing inwardly or back-firing; and the thin walls also reduce the amount of metal within the burning area to a minimum and give the maximum area of outlet for a gaseous fluid in a medium size burner.

In a square or rectangular burner the opening or bowl of the corrugated strip might be folded back and forth in parallel layers, or a series of concentric corrugated layers might be sleeved together, but a spiral formation is preferred for the reason that very tight folds can be quickly and conveniently made in and to any desired diameter. A burner of approximately one and three-fourths inch in diameter embodying this invention produces a high round conical flame of intense heating character, and this burner has been found to give entire satisfaction in domestic ranges.

What I claim is:

1. A burner body having a relatively thin removable band seated therein within which a cellular comb provides a multitude of vapor discharge passages co-axially of the ring.

2. A cylindrical burner body having a reduced extremity, a flaring fuel supply neck connecting said body and extremity, and a relatively thin removable band therein within said body having a corrugated sheet-metal strip compactly coiled therein.

Signed at Cleveland, in the county of Cuyahoga, and State of Ohio, this 23rd day of December, 1919.

CHARLES W. STINE.