Oct. 15, 1935. L. S. BROWN 2,017,338

GAS BURNER

Filed March 16, 1931

Fig. 1

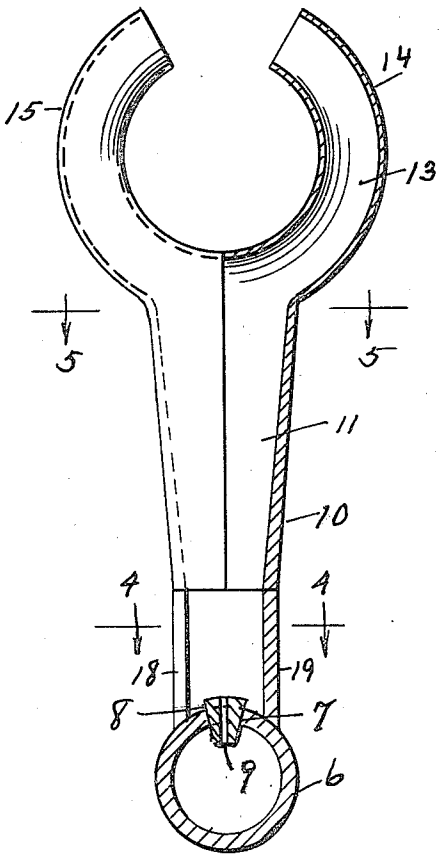
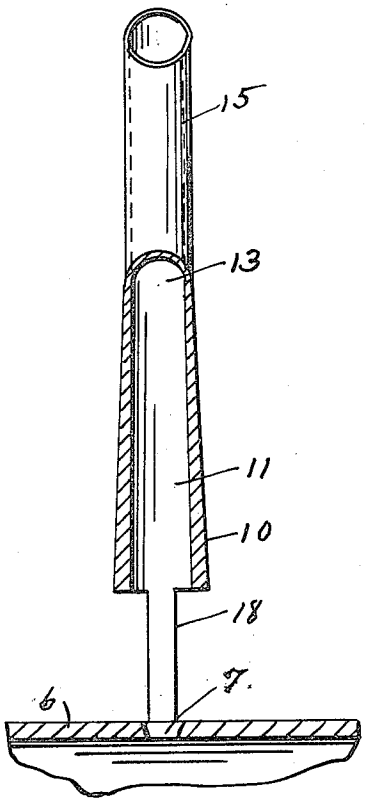


Fig. 2



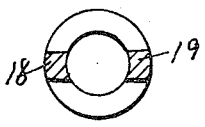


Fig. 4

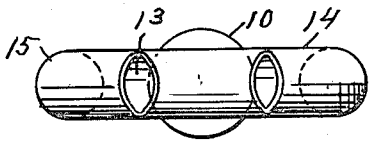


Fig 3

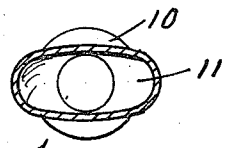


Fig. 5.

INVENTOR.

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GAS BURNER

Luther S. Brown, Fresno, Calif.

Application March 16, 1931, Serial No. 523,039

11 Claims. (Cl. 158—104)

My invention relates primarily to a burner for heating purposes such as are used in furnaces, boilers, and similar types of heating devices (although it is not limited to any particular device or purpose) and it has for its prime object the provision of a burner which will work efficiently with any type of fluid gas used for heating, and particularly natural and casing head or liquid gas.

A still further object is to provide a burner of the above character which is equally adaptable for either stationary or portable heaters and which will work with equal facility in any position or at any angle.

Another object is to provide a burner of the above character which will be simple in construction and operation, of a maximum efficiency, and provide practically perfect or complete combustion.

A still further object is to provide a burner of the above character in which the proportion of fluid and air may be determined previously to installation whereby necessity for readjustment is avoided.

Other objects and advantages will appear hereinafter and, while I have shown and will describe the preferred form of my invention it will be understood that I do not limit myself to such preferred form but that various changes and adaptations may be made therein without departing from the spirit of my invention.

In the drawing accompanying and forming a part hereof:

Fig. 1 is a front elevation, partly in section, of my burner as positioned for use upon a manifold.

Fig. 2 is a central vertical section through Fig. 1 taken at right angles thereto.

Fig. 3 is a top plan of my burner.

Fig. 4 is a section on the line 4—4 of Fig. 1.

Fig. 5 is a section on the line 5—5 of Fig. 1.

Referring to the drawing, 6 indicates a manifold supported in any suitable or desired manner (not shown) provided with an outlet opening 7 in which is mounted a tip 8 having a minute orifice 9 through which the gas escapes from manifold 6.

My burner comprises an upstanding tubular main stem 10 the interior of which tapers upwardly from the bottom to form a primary mixing chamber 11 which gradually increases in area upwardly. The upper end of this main stem is flattened into an oval shape (see Fig. 5) and upon this upper end is mounted the arcuate secondary mixing chamber 13 which forms a divided extension of chamber 11. Each of the extensions 14 and 15 of chamber 13 is substantially one half the cross-sectional area of the upper end of chamber 11 and their upper ends terminate at an equal distance from each side of a line passing through the vertical center of stem 10, this spaced relation being such as to permit the fuel to escape from the ends while flowing at a slight upward angle so that as the jets impinge upon each other the direction of flow will be changed to a fan shape radiation. The lower end of stem 10 is open to atmosphere over its entire area and is provided with supporting legs 18 and 19, the lower ends of these legs being welded or otherwise rigidly secured to the manifold 6 so that the lower end of chamber 11 is supported centrally over the orifice 9 of tip 8.

While I have shown and described the main tubular stem 10 as being flattened in shape as shown in Fig. 5, this construction is not strictly essential but is merely to bring said upper end into position to unite with the lesser diameter of the chamber 13.

While I have shown a single unit only it will be obvious that my burner may be mounted in multiples or batteries where necessary or desirable.

The superior merit of my gas burner for heating purposes resides in combining a primary mixing chamber, which gradually increases in area from the bottom to the top, with a secondary mixing chamber superimposed upon and communicating with the primary chamber, which secondary chamber divides the stream from the primary chamber and reunites it at the point of combustion, permitting a larger proportion of air to be mixed with the gas and spreading the flame into a fan shape.

This burner can be ignited and will burn with equal facility in any position. It may be inverted so that the flame will extend downwardy from the end of the burner arms. These vertical, horizontal or inverted positions permit of making a portable burner for use in heating surfaces such as asphalt paving, removing paint, or heating any surface.

Having described my invention, what I claim is:

1. In a gas burner the combination with a manifold having a burner tip therein, said tip having an orifice; of a burner tube superposed above said burner tip concentric therewith, said tube gradually increasing in cross-sectional or transverse area from the bottom to the top and terminating at its upper end in a pair of spaced arcuate hol-

low arms, the upper ends of which terminate at a distance apart and are so positioned that streams of fluid flowing therefrom will impinge upon each other.

2. A burner of the character described comprising a vertically extending tubular stem terminating at its upper end in a pair of spaced arcuate arms, said arms extending upwardly from said stem in the same vertical plane with each other and with the stem and terminating at a distance apart; a continuous fuel passage through said stem and arms, the passage through said stem gradually increasing in transverse area from the bottom to the top, and the passage through each of said arms being substantially one-half the greatest transverse area of the passage through the stem.

3. A gas burner comprising a primary and a secondary mixing chamber positioned one above the other and in communication; the lower chamber being the primary chamber and gradually increasing in cross-sectional or transverse area from the bottom to the top; the upper chamber being the secondary chamber and being formed of two halves, each of which is substantially equal to one-half the cross-sectional or transverse area of the upper end of the primary mixing chamber.

4. A burner of the character described comprising a stem having a primary mixing chamber therein, said chamber gradually increasing in cross-sectional or transverse area from one end to the other; a pair of spaced arcuate arms extending from the larger end of said mixing chamber, said arms being hollow and forming a secondary mixing chamber; said secondary mixing chamber being of substantially one-half the cross-sectional or transverse area of the upper end of the primary mixing chamber and being so constructed and arranged that streams of fluid flowing therefrom will impinge upon each other at a point on the line passing through the longitudinal center of the primary mixing chamber.

5. In a gas burner a main stem terminating at its upper end in a pair of spaced arcuate arms, said arms curving outwardly and upwardly and then inwardly and terminating at equal distances on opposite sides of a line passing through the vertical center of said stem; the upper ends of said arms being so positioned that streams of fluid passing therefrom will travel at a slightly upward angle and impinge upon each other; a mixing chamber in said stem gradually increasing in cross-sectional or transverse area from the bottom to the top and a secondary mixing chamber in said arms, the cross-sectional or transverse area of each of said arms being substantially equal to one-half the cross-sectional or transverse area of the upper end of the stem; and an air inlet in the lower end of said stem.

6. A gas burner comprising a primary mixing chamber and a secondary mixing chamber superimposed one upon the other and connected together at their abutting ends, the lower chamber being the primary chamber and the upper chamber being the secondary chamber, the primary chamber gradually increasing in cross-sectional or transverse area from the bottom to the top and the secondary chamber being formed of two spaced arcuate fuel passages each of substantially one-half the cross-sectional or transverse area of the upper end of the primary chamber and being so disposed that the stream of fluid flowing through said primary chamber will be divided by said secondary chamber and reunited at the point of combustion; and an air inlet in the lower end of said primary mixing chamber.

7. A burner of the character described comprising an elongated hollow stem provided at one end with an air inlet and a fuel inlet, and at its other end with a pair of arcuate oppositely disposed fuel passages in communication therewith and forming a mixing chamber, each of said fuel passages being substantially equal to one-half the capacity of said stem and being so positioned as to equally divide the fuel stream from said stem and reunite the same at the point of combustion; said hollow stem gradually increasing in cross-sectional or transverse area from the air inlet to its connection with said arcuate fuel passages.

8. A burner of the character described comprising a hollow stem adapted to be connected at one end to a source of fuel supply and having provided at its other end a pair of arcuate oppositely disposed fuel passages forming a secondary mixing chamber, said hollow stem gradually increasing in transverse area from the inlet end of the secondary mixing chamber and forming a primary mixing chamber.

9. A burner of the character described including an elongated primary mixing chamber gradually increasing in cross-sectional or transverse area from the bottom to the top and a secondary mixing chamber communicating with the larger end of said primary mixing chamber, said secondary mixing chamber being composed of a pair of curved fluid passages so disposed as to divide the stream of fluid from the primary chamber into two halves and unite the same at the point of combustion, the cross-sectional or transverse area of each half of said secondary mixing chamber being substantially one-half the cross-sectional or transverse area of the upper end of the primary mixing chamber, and the entire lower end of said primary mixing chamber being open to atmosphere.

10. A burner of the character described comprising in combination a manifold having an upwardly projecting tip, a minute fuel opening in said tip, a vertically extending tubular stem superposed above said tip, concentric therewith, the upper end of said stem terminating in a pair of spaced arcuate arms, said stem and arms being hollow and in communication with each other to form a continuous passage therethrough, the passage through said stem gradually increasing in transverse area from the bottom to the top and the passage through each of said arms being substantially one-half the greatest transverse area of the passage through said stem.

11. A burner of the character described comprising in combination a manifold having an opening therein and a burner tip in said opening extending upwardly, a vertically extending tubular stem superposed above said tip concentric therewith and terminating at its upper end in a pair of spaced arcuate hollow arms, the upper ends of which extend to a point an equal distance on each side of the vertical center line of the stem, a continuous fuel passage through said stem and arms, the passage through said stem gradually increasing in transverse area from the bottom to the top, and being round in transverse cross-section at the bottom and substantially oval in transverse cross section at its junction with said arms, the passage through each of said arms being substantially one-half the cross transverse area of the upper end of the passage through the stem.

LUTHER S. BROWN.