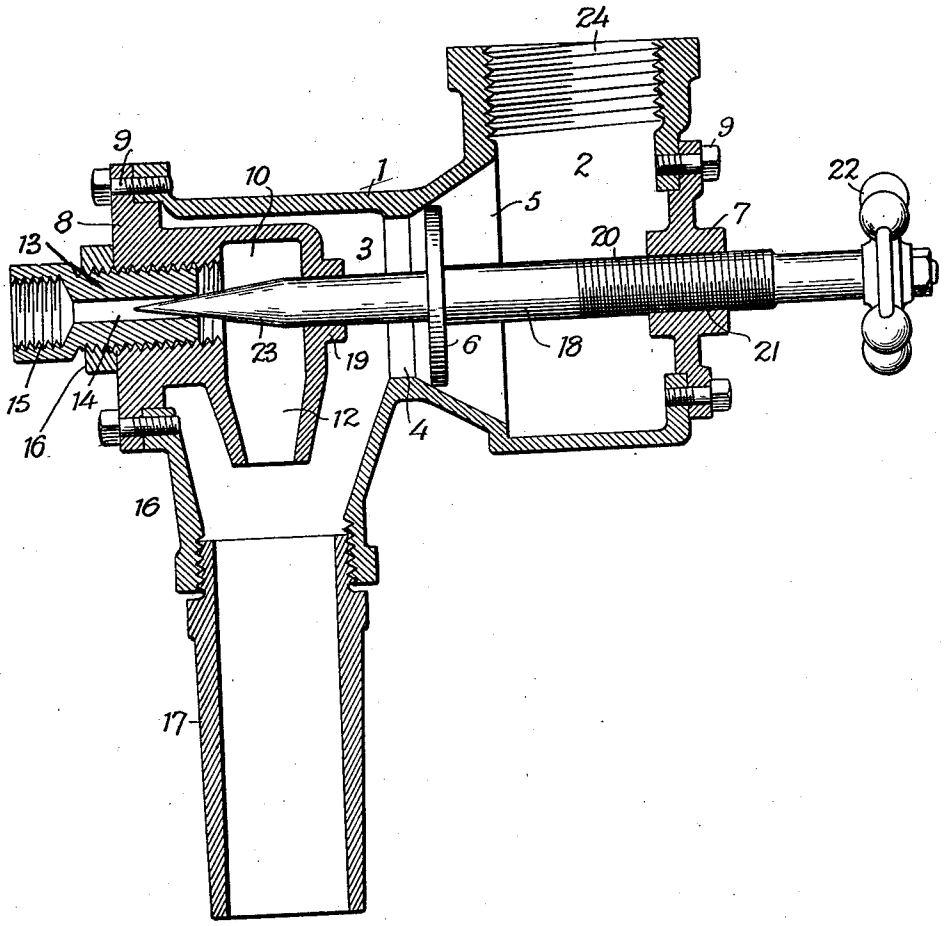
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GAS BURNER

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GAS BURNER

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This invention relates to gas burners, and particularly to burners of that type in which illuminating or like gas and air are mixed in the burner and on their flow to the burner orifice to form a combustible fluid in which the air and gas are commingled in determined proportions.

Heating burners for certain kinds of apparatus, as, for instance, for use in connection with glass feeders, as heretofore constructed, have been uncertain and unreliable in action and have failed to meet the demand for a standard type of burner adapted to efficiently burn a mixture of air with gas of the different kinds or grades found in different communities and in which the air is supplied at low pressure from a fan or the like.

The primary object of my invention is to provide a burner in which the air and gas admission valves are constructed and designed for proper relative actions and operate in any position, from closed to wide open, to supply the proper quantity of air and gas for admixture at any degree of opening.

A further object of the invention is to provide a burner in which interchangeable gas inlet and valve seat tubes or fittings may be used to adapt the burner to suit different kinds and pressures of gas which may be supplied, so that a standard type of burner is produced for efficient use in all communities.

The accompanying drawing shows in central longitudinal section a burner constructed in accordance with my invention.

Referring now more particularly to the drawing, 1 designates the burner casing which is formed to provide an air receiving chamber 2 and a gas and air mixing chamber 3, said chambers being in communication through a restricted air feed port 4. A tapering passage 5 is provided between the chambers 2 and 3, within which passage moves an air feed controlling valve 6 which governs the flow of air through the port 4.

The outer sides of the chambers 2 and 3, that is, those sides directly opposite the joined sides of the chambers communicating through the port 4, are normally open and are closed in practice by closure plates 7 and 8 which are detachably secured to the casing body by screws or like fastenings 9. Formed integrally with the detachable closure plate 8 is a gas receiving chamber 10 communicating at its side facing the plate 8 with a threaded opening 11 extending through said plate, and provided at its base portion with a tapering or frustro-conical suction tube 12 constituting a gas outlet. Fitted in the threaded opening 11 is a gas inlet tube 13 provided with a gas feed bore, channel or orifice 14, said orifice extending between the inner end of said tube and an internally threaded applicator cap or fitting 15 adapted for connection with a gas supply pipe. The tube 13 is adjustable in the opening 11 for a purpose hereinafter described and is adapted to be fastened in adjusted position by a clamping or check nut 16. Extending from a side of the mixing chamber 3 at right angles to that side closed by the closure plate 8 is a tapering outlet for the air and gas mixture, which outlet is internally threaded to receive one end of a burner tube 17 or a conductor to which a burner is attached.

Extending axially through the chambers 2, 3 and 10 and through the opening 4 is a rotary stem 18 journaled near one end in a bearing 19 in the inner wall of the chamber 10 and provided adjacent to its opposite end with screw threads 20 extending through and engaging a threaded opening 21 in the closure cap 7 whereby the stem is rotatably mounted for a feed motion in a direction toward and from the gas feed tube 13. The end of the stem provided with the threads 20 carries a suitable operating handle 22, and on that part of the stem projecting through the passage 5 the valve 6 is mounted and the end of the stem projecting toward the gas tube 13 beyond the bearing 19 is formed to provide a tapered valve member 23 which is adapted to extend to a greater or less extent into the channel 14 of the tube 13 and to close against the wall at the rear wall of said channel as a seat. The valves 6 and 23 are thus carried by the stem 18 for simultaneous or conjoint movement to control the inlet of air to the chamber 3 through the passage 5 and opening 4 and to control the inlet of gas from the channel 14 into the chamber 10 and thence

through the outlet 12 into the chamber 3. The valve 6 is disk-shaped or of mushroom type and is of such diameter relative to the contracted end of the passage 5 as to close against such contracted end of the passage in close proximity to the opening 4 at the moment the valve 23 closes against its seat at the inner end of the channel 14. The taper of the passage 5 and that of the valve 23 is such that, while, in the opening movement of the valves, the volumetric admission of gas and air will increase proportionately to the degree of opening movement of the valves, the ratio of proportion of air and gas to be employed to form the fuel mixture will at all times be maintained irrespective of the degree of opening movement of the valves. This ratio is fixed by initially turning the stem 18 to seat the valve 6 before the gas inlet tube 13 is applied or properly set in the opening 11, and then adjusting said tube 13 in the opening 11 until its channel 14 is closed by the tapering valve 23, when the burner will be set to supply a definite proportion of gas and air for admixture without regard to the volume admitted, which is controlled by opening the valves to a greater or less extent. A tube 13 of a predetermined or gaged size may be employed to provide for the feed of a given proportion of gas with respect to a given proportion of air in order to suit conditions required with respect to the character or quality of gas used in any certain community, and, by the use of interchangeable tubes 13, having channels 14 varying in diameter, the setting of the tube may be varied with respect to the valve 23 to change the proportion of gas with respect to that of the air to suit the quality or character of gas supplied in other communities. Thus it will be understood that the device may be regulated to supply air and gas in any given volume, within a predetermined period of time, while keeping the air and gas proportions fixed or constant, so that, with due regard to the character or quality of gas supplied, a mixture of the exact degree of richness to secure perfect combustion may at all times be supplied to the burner. A standard type of burner may thus be made which may be employed with equal efficiency in all communities notwithstanding variations in character and quality of gas, as well as the density of the air, by the use of a number of interchangeable gas inlet tubes 13 and a preliminary adjustment of the valves to set the valves with relation to their seats so as to govern the proportion of air and gas admitted on an opening movement of the valves to any degree. The chamber 2 is provided with an inlet 24 internally threaded for connection with a suitable type of air supply conductor leading from a source of supply of air under low pressure, such, for example, as an air supply fan driven in any preferred manner. By the use of a valve construction of the character described a burner is provided which will operate with great efficiency in connection with low pressure fans or blowers varying to certain degrees in their delivery pressures and in communities where, through altitude or other variations, the air varies to material degrees in density.

In the operation of the device, the valve mechanism is adjusted to supply the air and gas in the proper proportions, after which the valve is opened to the extent desired for supplying air and gas in a constant proportion, but varying in volume as needed, to the mixing chamber, from which the mixed fuel passes to the burner 17 for use, the mixing action and feed being promoted when the burner is in operation by an instituted suction action, as will be readily understood. According to the temperature required the volume of fuel supplied to the burner for combustion may be increased to any extent desired by opening the valves, without changing the gas and air proportions of the mixture, so that a mixture of always the same degree of richness will be supplied. This allows the heating action to be governed or controlled with great accuracy in cases where a certain exact degree of temperature should be maintained, as, for example, in the heating of glass for the supply of liquefied glass to a feeder for delivery to molds, etc.

Having thus fully described my invention, I claim:

1. A gas burner comprising a burner casing having an air inlet chamber open at its outer side, a mixing chamber open at its outer side, a burner communicating with the mixing chamber, a tapering air feed passage connecting the air inlet chamber at its inner side with the inner side of the mixing chamber, closures for the outer sides of the chambers, said closures having threaded openings, a gas inlet chamber carried by the closure of the mixing chamber and communicating with the latter, a gas feed tube having a gas channel and adjustable in the threaded opening in the closure of the mixing chamber, a valve stem in threaded engagement with the threaded opening in the closure of the air inlet chamber, a tapering valve member carried by said stem and controlling the channel in the gas feed tube, and a disk-shaped valve carried by the stem and controlling the tapering air inlet passage.

2. A gas burner comprising a casing having an air inlet chamber, a mixing chamber, a fuel mixture discharge passage leading from the mixing chamber, a gas inlet chamber communicating with the mixing chamber, and an air feed port between the air inlet chamber and the mixing chamber, a valve stem adjustably mounted for endwise movement in the casing, a gas inlet nipple for connecting the gas inlet chamber with a source of gas supply, a

valve member carried by the stem to control the air feed port, the surfaces of said valve member and port being relatively tapered, and a second valve member carried by the stem for concurrent movement with the first-named valve member, said second valve member controlling the inlet of gas through the bore of the nipple and the surfaces of said bore and the valve being relatively tapered.

3. A gas burner comprising a casing having an air inlet chamber, a mixing chamber, a fuel mixture discharge passage leading from the mixing chamber, a gas inlet chamber communicating with the mixing chamber, and an air feed port between the air inlet chamber and the mixing chamber, a valve stem adjustably mounted for endwise movement in the casing, a gas inlet nipple for connecting the gas inlet chamber with a source of gas supply, a valve member carried by the stem to control the air feed port, the surfaces of said valve member and port being relatively tapered, and a second tapered valve member carried by the stem for concurrent movement with the first-named valve member and movable in and controlling the inlet of gas through the bore of the nipple, said nipple being mounted for adjustment relative to said valve member.

4. A gas burner comprising a burner casing having a mixing chamber at one end thereof, an air inlet chamber at the opposite end thereof, an air feed port between said chambers, a threaded stem extending longitudinally of the casing and through the air inlet chamber, air feed port and mixing chamber and provided with air and gas feed valve members, the said air feed valve member governing the flow of air through the said air feed port, and a gas inlet nipple communicating with the mixing chamber and receiving the gas feed valve, said nipple being adjustable on the casing with relation to the valve, the air feed port and valve being relatively tapered and the gas inlet valve and nipple having coacting tapered surfaces.

5. A gas burner comprising a burner casing having a mixing chamber, a burner communicating therewith, an air feed passage leading to the mixing chamber, a suction tube communicating with the mixing chamber, a gas feed nipple having a gas feed channel communicating with the suction tube, a valve movable in and controlling the air feed passage, said passage and valve being relatively tapered, a tapering valve member movable in and controlling the channel in the gas feed nipple, the latter being adjustable with relation to said valve member, and an endwise movable stem carrying said valves and operable for conjointly moving the same.

6. A gas burner comprising a burner body having a mixing chamber, an air inlet chamber, a burner communicating with the mixing chamber, a tapering air feed passage between the air inlet chamber and mixing chamber, a suction tube communicating with the mixing chamber, a gas feed nipple having a gas feed channel communicating with the suction tube, a disk-shaped valve movable in and controlling the tapering air passage, a tapering valve movable in and controlling the gas feed channel, the gas feed nipple being adjustable with relation to said valve, and an endwise stem carrying the valves and operable for conjointly moving the same.

7. A gas burner comprising a burner casing having a mixing chamber, an air feed passage leading to said chamber, a suction tube communicating with the mixing chamber, a gas feed conductor having a feed channel communicating with the suction tube, a valve movable in the air passage to control the admission of air to the mixing chamber, the surfaces of said passage and valve being relatively tapered, a gas feed valve movable in the gas feed channel of the gas feed member, the surfaces of the channel and gas feed valve being relatively tapered, and an endwise movable stem mounted on the casing and extending longitudinally thereof and carrying said valves, the said gas feed member being adjustable relatively to the gas feed valve.

8. A gas burner comprising a burner casing having an air inlet chamber open at its outer side, a mixing chamber open at its outer side, a burner communicating with the mixing chamber, an air feed passage connecting the air inlet chamber at its inner side with the inner side of the mixing chamber, a tapering air feed passage connecting the air inlet chamber at its inner side with the inner side of the mixing chamber, closures for the outer sides of the chambers, said closures having threaded openings, a gas inlet chamber carried by the closure of the mixing chamber and communicating with the latter, a gas feed tube having a gas channel and adjustable in the threaded opening in the closure of the mixing chamber, a valve stem in threaded engagement with the threaded opening in the closure of the air inlet chamber, a tapering valve member carried by said stem and controlling the channel in the gas feed tube, and a valve member carried by the stem and controlling the air inlet passage.

In testimony whereof I affix my signature.

ALBERT R. BETHEL.