June 22, 1948. O. E. SCHLACHTER 2,443,933

GAS MIXER

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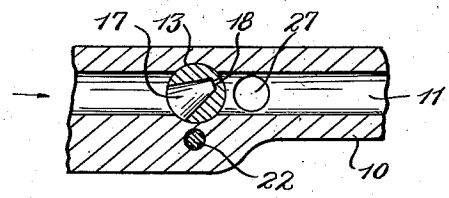


FIG. 1

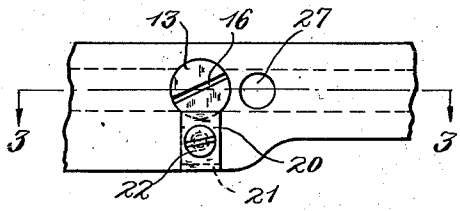


FIG. 2

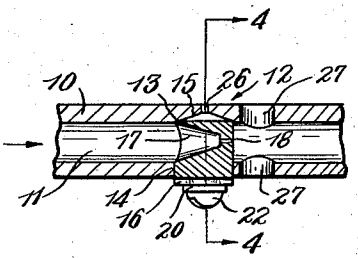


FIG. 3

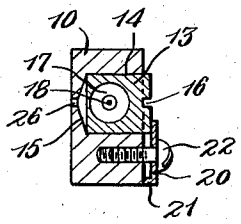


FIG. 4

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GAS MIXER

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1 Claim. (Cl. 158—118)

1

This invention relates to improvements in gas mixers, and to a novel gas spud forming a part of such a mixer.

Heretofore, mixers of the Bunsen type have been constructed upon the principle of controlling the mixture by varying the amount of air permitted to enter a conductor under the induction effect of a fixed gas stream. In accordance with the present invention the air intake is of predetermined, fixed size, and control is effected by changing the efficiency of the induction effect.

The invention has important advantages. Gas burning apparatus must be designed for use with any of the different types of gas which are available in different localities. These gases are of widely different composition and characteristics, and the amount of air necessary to produce efficient combustion with one may be entirely unsuitable for another. Gas pressure is also one of the factors entering into the size of air openings. In mixers of these conventional types the air openings are made of the maximum size required under any conditions, and provision is made for cutting them down by adjustment to the required size for the particular job in hand. As the size of the air opening decreases the velocity of the air increases, and the tendency for the air to pick up lint and to deposit it in the air opening correspondingly increases. Cleaning of the air openings at frequent intervals is therefore indicated. The spud openings are extremely small, particularly for pilot burners, and they frequently become clogged, due to impurities in the gas. Their removal for cleaning is difficult.

In accordance with the present invention the air openings are maximum and remain maximum. The spud is mounted transversely of the conductor so that it may be readily removed for cleaning or replacement. Furthermore, it may be rotatably adjusted to change the angle of discharge of gas into the conductor and thereby change the induction effect, that is to say, while the amount of gas entering the conductor remains constant, its direction of flow may be regulated in such manner as to induce the flow of a greater or lesser amount of air through the air openings of fixed size. When the spud orifice is disposed axially of the conductor the induction action is most efficient and the proportion of air is maximum. The adjustment of the orifice angularly away from axial position decreases the proportion of air in the mixture. Because the air openings are not reduced in area the air velocity is low and the lint pick-up is correspondingly low.

One of the objects therefore is the provision

2

of a novel means and method for controlling the proportions of gas and air making a combustible mixture.

Another object is the provision of a means and method for controlling gas and air mixture which functions to admit air at relatively low velocity.

A further object is the provision of a gas spud having an adjusting means which functions to vary the amount of air entering into the mixture.

Still another object is the provision of a spud which may be readily removed.

Other objects and features of novelty will appear as I proceed with the description of that embodiment of the invention which, for the purposes of the present application I have illustrated in the accompanying drawing, in which

Fig. 1 is an axial sectional view of a fragment of a gas conductor in which my invention is employed;

Fig. 2 is an elevational view of the same;

Fig. 3 is an axial sectional view substantially along the line 3—3 of Fig. 2, that is, at right angles to the section of Fig. 1, but showing the gas spud in a different position of adjustment, and

Fig. 4 is a cross-sectional view taken along the line 4—4 of Fig. 3.

In the drawing a gas conductor is indicated at 10, having a cylindrical bore 11. A mixer generally indicated at 12 is incorporated in the conductor, so that correct proportions of air and gas for the production of efficient combustion may be fed to a pilot or other burner, not shown.

The mixer of the present invention comprises a plug 13 of round cross-section having a close fit within a transverse socket 14 drilled into the conductor from one side thereof and terminating in a conical end wall 15. The inner end of the plug has a flat surface for engagement with the conical end wall of the socket. The opposite or exposed end of the plug is provided with means for rotatably adjusting it, taking the form preferably of a screw driver slot 16.

A gas passage extends crosswise of the plug. While the form of this passage may vary, I prefer that it include a substantially conical portion 17 on the upstream side extending almost to the surface of the plug on the downstream side, this conical portion communicating with a short constricted orifice 18. The two portions 17 and 18 of this passage preferably have a common axis which in one position of the plug coincides with the axis of the bore 11. When the plug is turned

upon its axis for adjustment purposes the orifice 18 moves in a plane through the axis of the bore 11 at right angles to the axis of the plug.

Means is provided to hold the plug seated against the conical surface 15 in order to effect a substantially gas-tight seal between the plug and the conductor. In the illustrated case this is accomplished by means of a small flat plate or washer 20, one edge of which is provided with a flange 21 for engagement with a side wall of conductor 10, and another edge of which overlies a peripheral portion of the exposed end of the plug. Plate 20 has a hole therethrough to take a screw 22 which extends into a threaded hole in the conductor 10, the head of the screw contacting the plate, as illustrated in Figs. 3 and 4. In this manner pressure is exerted to draw the plug into its socket but the means for rotatably adjusting the plug, that is, the screw driver slot 16, is not interfered with.

A small aperture 26 may be formed in the conductor in alignment with the axis of the plug socket 14 in order to receive a pointed instrument for dislodging the plug when it is to be removed for cleaning or replacement, that is, in case it tends to stick in the socket. Removal of the plug of course must be preceded by loosening the screw 22 and moving the plate 20 away from contact with the exposed end of the plug.

The mixer 12 comprises, in addition to the plug, one or more ports 27 on the downstream side of the plug for admitting air into the conductor. These ports are large enough to admit the maximum quantity of air which may be required under any circumstances.

When the plug is in the position of adjustment illustrated in Figs. 3 and 4, that is, with the axis of the passage 17, 18 coinciding with the axis of the bore 11, the stream of gas flowing through orifice 18 exercises its greatest effect for inducing the flow of air into the conductor through the ports 27. In other words, the inducing effect is then most efficient. Hence the ratio of air to gas is then at its maximum. When the

plug is turned so as to swing the orifice 18 away from the position of Figs. 3 and 4, as for example to that of Fig. 1, the flow of gas out of the orifice continues at the same rate, but its direction is so changed that the induction effect is lessened and consequently the ratio of air to gas is reduced.

Having thus described my invention, I claim:

In mixing apparatus of the class described, a gas conductor having a primary air inlet opening, a plug disposed across the conductor passage upstream of said inlet opening, and having a constricted passage terminating in an orifice substantially smaller than the sectional area of said conductor passage immediately therebeyond and adapted to produce a gas jet in flow-inducing relation to said air inlet opening, said plug passage being transverse of said plug and said jet being generally along said conductor passage, said plug being mounted for adjustment about a central axis transverse of said conductor to vary the effectiveness of said relation without affecting gas flow through said orifice.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
750,822	Daley	Feb. 2, 1904
1,201,378	Stettner	Oct. 17, 1916
1,319,782	Maul	Oct. 28, 1919
1,355,998	Needham	Oct. 19, 1920
1,387,565	Thorp	Aug. 16, 1921
2,117,944	Cochrane	May 17, 1938
2,187,010	Beckman et al.	Jan. 16, 1940
2,248,932	Anderson et al.	July 15, 1941

FOREIGN PATENTS

Number	Country	Date
29,831	France	Nov. 30, 1922
182,909	Great Britain	July 11, 1922
243,847	Great Britain	Dec. 10, 1925
682,226	Germany	Oct. 11, 1939