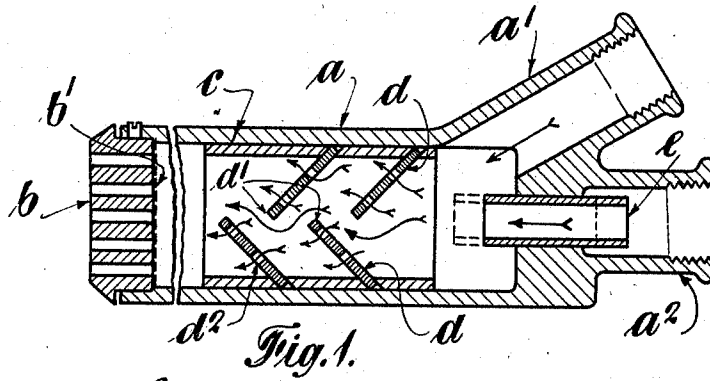
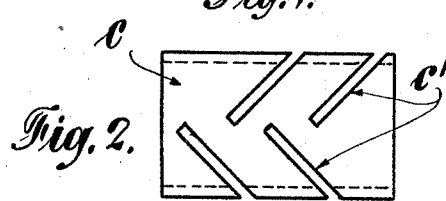
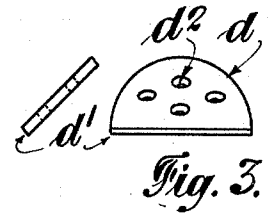


J. M. WALLWIN.
GAS AND AIR MIXER.
APPLICATION FILED APR. 30, 1918.

1,312,147.

Patented Aug. 5, 1919.



Inventor:-
Josiah Mower Wallwin
By his Attorney:- Walter Gurn.

UNITED STATES PATENT OFFICE.

JOSIAH MOWER WALLWIN, OF WARWICK, ENGLAND.

GAS AND AIR MIXER.

1,312,147.

Specification of Letters Patent.

Patented Aug. 5, 1919.

Application filed April 30, 1918. Serial No 231,777.

To all whom it may concern:

Be it known that I, JOSIAH MOWER WALLWIN, a subject of the King of Great Britain and Ireland, and resident of Warwick, in the county of Warwick, England, have invented a new or Improved Gas and Air Mixer, of which the following is a specification.

The present invention refers to burners used for heating purposes in which the air and gas are supplied at a pressure above atmosphere, and refers more particularly to such burners employed for metal heating, hardening and tempering furnaces and the like, the main object being to provide a burner of the kind referred to of improved construction whereby efficient commingling of the gas and air is effected without unduly impeding the flow of the combustible mixture, a further object being the provision of means whereby the effect of the air upon the gas (or the gas upon the air), as it enters the conduit, may be regulated so as to give neither a choking effect, a sucking effect, or to give such effects if and when required to the extent desired, the general result being a greater heating efficiency and a reduced consumption of gas.

The invention will be described in detail with the aid of the accompanying drawings, wherein:

Figure 1 illustrates a longitudinal section of one example of the improved burner.

Figs. 2 and 3 illustrate side and end views of detail parts separate from the burner.

a is the usual metal conduit leading to the burner head b . Such conduit at its other end is formed with inlet branches a' , a^2 , the latter being coaxial with the conduit, and the former lying at an angle thereto, as shown. Gas will preferably enter through the inlet a' and air (under a pressure above atmosphere) through the inlet a^2 .

Within the conduit is fitted a tube c , within and upon the opposite inner sides of which are fitted one or more pairs of forwardly inclined baffle plates d , two pairs being shown in Fig. 1. The inner edges d' of the baffle plates on one side lie centrally between the like edges of the other baffle plates. Further, the distance between one baffle plate and the next, is such as to provide a passage, the area of which is greater (preferably about 25%) than the combined

areas of the gas and air inlet branches a' , a^2 . The area of the passage should also be larger than the collective area of the holes in the burner head, so as to avoid back pressure.

In each baffle plate are perforations d^2 so as to allow some of the gas and air to pass through the plates.

With the gas and air entering the conduit under pressure and passing forward to the burner head b a portion of the gas and air flows over and under the edges of the plates in a zig-zag path, the stream being first deflected in one direction and then in another direction, and the gas and air being thereby thoroughly intermixed. The other portions of the gas and air pass through the perforations d^2 and are thereby also given a zig-zag path, the holes being arranged at such an angle as to direct the gas and air toward the inner face of the conduit, against which they impinge and by which they are in turn deflected back toward the axis of the conduit, where they mingle with the stream of gas and air passing between the inner edges of the plates. In this way no portion of the gas and air has a direct path to the burner, but is deflected and caused to follow a tortuous path, by which complete mixing is assured.

The baffle plates are preferably made separate from the tube c and this latter is provided with saw-cuts c' , see Fig. 2, in which the plates d are fitted and soldered. The inner edges of the plates may slightly overlap.

To prevent the air choking or sucking the gas, or to produce one or other of such effects as desired, the air inlet a^2 is fitted with a tube e , see Fig. 1, adapted to be adjusted in an axial direction and thereby to project more or less at one end into the conduit. By adjusting the tube to project say only a short distance into the conduit, the air, by spreading outward as soon as it leaves the tube, will choke or retard the free flow of the gas, while by adjusting the tube to say the position shown in dotted lines, it will cause the air to have a slight drawing or ejecting action on the gas. To avoid either of these effects, or reduce them to a minimum, the tube will be set to the neutral position shown in full lines.

While described as serving to control the effect of the air on the gas, the tube e will

serve also to control the effect of the gas on the air, when the gas is supplied under high pressure.

What I claim is:—

- 5 1. In pressure gas and air burners and mixing apparatus therefor a conduit, pairs of forwardly inclined and perforated baffle plates on the opposite inner faces of the conduit, the inner edges of the plates on one
10 face lying between the inner edges of the plates on the other face, and the area of the space between the edges of the adjoining plates being larger than the area of the gas and air inlets combined, and also larger
15 than the collective area of the holes in the burner head, as set forth.
2. In pressure gas and air burners and mixing apparatus therefor a conduit, a tube within the conduit and pairs of forwardly
20 inclined perforated plates on the opposite inner faces of the tube, the inner edges of the plates on one face lying between the inner edges of the plates on the other face, and the area of the space between the edges of
25 adjoining plates being larger than the area of the gas and air inlets combined, and also larger than the collective area of the holes in the burner head, substantially as herein set forth.
- 30 3. In pressure gas and air burners and mixing apparatus therefor, a conduit having converging gas and air inlets at one end and

a burner head at the other end, pairs of forwardly inclined and perforated baffle plates on the opposite inner faces of the conduit, 35 the inner edges of the plates on one face lying between the inner edges of the plates on the other face, and the area of the space between the edges of the adjoining plates being larger than the area of the gas and air 40 inlets combined, and also larger than the collective area of the holes in the burner head, as set forth.

4. In pressure gas and air burners and mixing apparatus therefor, a conduit having 45 converging gas and air inlets at one end and a burner head at the other end, and also having an axially adjustable tube in one of said inlets, pairs of forwardly inclined and perforated baffle plates on the opposite 50 inner faces of the conduit, the inner edges of the plates on one face lying between the inner edges of the plates on the other face, and the area of the space between the edges of the adjoining plates being larger than the 55 area of the gas and air inlets combined, and also larger than the collective area of the holes in the burner head, as set forth.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOSIAH MOWER WALLWIN.

Witnesses:

ERNEST HARPER,
KATHLEEN M. THOMPSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."