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J. W. MARTIN

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DRAFT EQUALIZER FOR GAS BURNERS

Filed April 30, 1935

Fig. 1.

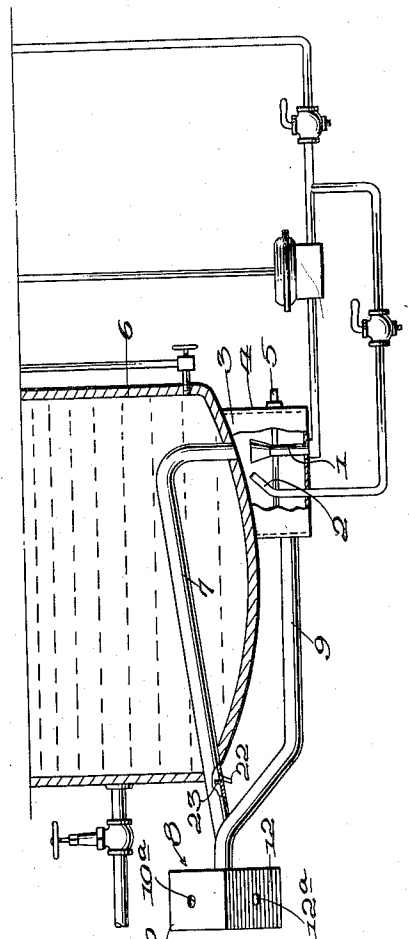


Fig. 5.

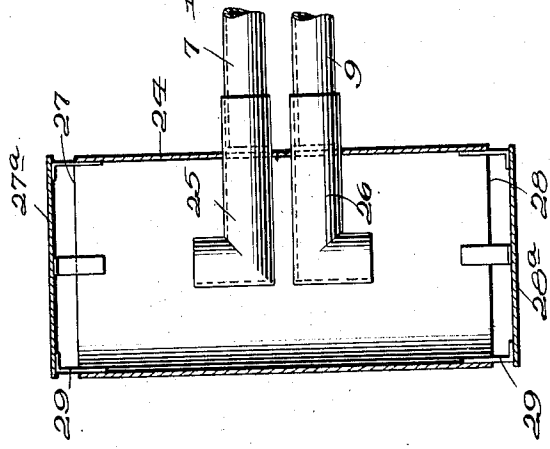


Fig. 4.

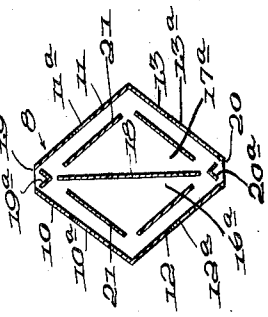


Fig. 3.

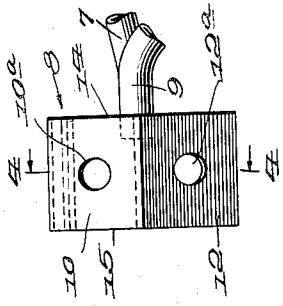
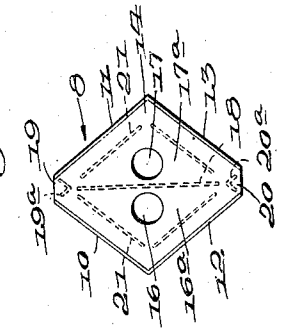


Fig. 2.



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UNITED STATES PATENT OFFICE

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DRAFT EQUALIZER FOR GAS BURNERS

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Application April 30, 1935, Serial No. 19,115

5 Claims. (Cl. 110-147)

My invention relates to new and useful im-
provements in a draft equalizer for gas burners
and the present application is a continuation in
part of my co-pending application Serial No.
731,231, filed June 19, 1934.

The object of this invention is to provide a
gas burner adapted for various uses and
equipped with means for preventing sudden
changes in atmospheric conditions from extin-
guishing the pilot or creating a back draft on the
flue through which the products of combustion
are discharged.

A further object of the invention is to pro-
vide means for equalizing the pressure in the
exhaust and intake conduits, thus preventing the
blowing out or sucking out of the flame.

With the above and other objects in view
which will appear as the description proceeds, my
invention resides in the novel features herein
set forth, illustrated in the accompanying draw-
ing and more particularly pointed out in the
appended claims.

Referring to the drawing in which numerals of
like character designate similar parts throughout
the several views,

Fig. 1 is a view in side elevation, partly broken
away showing one form of my invention instal-
led in connection with a liquefied petroleum
gas vaporizing apparatus of the type shown and
described in my co-pending application filed of
even date herewith, Serial No. 19,114.

Fig. 2 is an enlarged connecting end view of
the draft equalizer shown in Fig. 1.

Fig. 3 is a view in side elevation of the same.

Fig. 4 is a sectional view taken on line 4-4
of Fig. 3, and

Fig. 5 is an enlarged sectional view of a modi-
fication constituting the preferred form of draft
equalizer.

In the drawing, referring to Fig. 1, numeral
1 represents a gas burner of any suitable type
having a conventional pilot 2, said burner and
pilot being fed from any suitable source and
housed in a box or casing 3, the latter having a
door 4 which is adapted to be firmly secured in
place by a nut and bolt arrangement 5 of any
convenient type. The burner box 3 in the adap-
tation shown in the drawing, is located imme-
diately beneath the bottom wall of a receptacle
6 containing the fluid to be heated, a flue 7 ex-
tending upwardly through the bottom wall of
said receptacle for a predetermined distance and
then being inclined downwardly with its in-
clined end projecting outwardly from said re-
ceptacle and terminating in communication with

a draft equalizer 8 hereinafter referred to more
in detail.

The rear wall of the burner box 3 is provided
with a suitable opening for receiving the end of
an air intake conduit 9, the other end of which
terminates in communication with said draft
equalizer 8.

Referring to Figs. 2 to 4, inclusive, the form of
draft equalizer here shown consists of a hous-
ing having upper side walls 10 and 11, lower
side walls 12 and 13, and end walls 14 and 15.
The connecting end wall 14 is provided with two
openings 16 and 17 into which the ends of the
air intake conduit 9 and the exhaust conduit or
flue 7 are respectively connected, a transverse
vertical partition 18 being arranged substan-
tially centrally of the housing between said open-
ings to form intake and exhaust chambers 16a
and 17a, respectively.

The upper end of the housing is provided with
an exhaust opening 19 between adjacent ends of
the side walls 10 and 11, and the lower end of
said housing is provided with an intake opening
20 between adjacent ends of the side walls 12
and 13. Just inside the mouth of each of these
openings and extending entirely across the hous-
ing, I provide an angular baffle 19a and 20a, re-
spectively, to interrupt any sudden influx of air
through said openings.

The four side walls of the housing are pro-
vided with openings 10a, 11a, 12a and 13a, re-
spectively, and adjacent each of these openings I
provide baffle plates 21 which lie within the re-
spective chambers and extend transversely
across the housing with their adjacent ends in
spaced relation, as clearly shown in Figs. 2 and
4.

The flue 7 is preferably provided with a drain
outlet 22 (Fig. 1) adjacent the point where it
emerges from the receptacle 6, a dam or obstruc-
tion 23 extending across the lower portion of the
flue immediately posterior to the drain opening,
whereby any condensation in the flue is drained
out before it reaches the draft equalizer 8. This
apparatus is usually located out of doors, and in
extreme weather any moisture entering the
draft equalizer would freeze and eventually
obstruct one or more of the openings therein.

In the operation of this form of draft equalizer,
the products of combustion from the flue 7 are
discharged into chamber 17a through opening 17,
thence through the spaces between the baffles 21
and partition 18, exhausting to atmosphere
through openings 19, 11a and 13a. Fresh air is
drawn into chamber 16a by the draft created by

the heat of combustion, said fresh air passing through openings 19, 20, 19a and 12a, thence past the spaces between the baffles 21 and partition 18, and into the intake pipe 9.

5 The partition 18 separates the chambers 16a and 17a and prevents any appreciable mixture of the products of combustion with the fresh air taken into the burner. The baffles 19a, 20a and 21 prevent any outside atmospheric disturbances from passing unobstructed through the various 10 openings into the chambers 16a and 17a.

With these baffles and openings arranged in staggered relation, no outside atmospheric disturbances are transmitted directly into the chambers. For example, in the case of changing wind 15 velocity which is ordinarily the most serious of these atmospheric disturbances, the winds are caused to disperse and distribute themselves throughout the outer space between the baffles 20 21 and the walls of the housing, so that the effect of such disturbances is distributed simultaneously and with the same intensity to both chambers 16a and 17a, thus affecting an equal and balanced pressure throughout the combustion 25 system including the draft equalizer and the burner box. Obviously, under these conditions the flame is allowed to create its own positive draft regardless of outside atmospheric disturbances.

30 In Fig. 5 I have shown a device which operates upon the same principle as that just described but due to its simplicity, this modification is the form which I prefer to use in most instances.

This device consists of a cylindrical housing 24 35 which is vertically disposed in place of the draft equalizer 8 just described, with the flue 7 connected into an L 25 which projects through the wall of the housing 24 with its open end directed upwardly, and the air intake conduit 9 connected into a similar L 26 extending through the wall of 40 the housing with its open end directed downwardly. It will be noted that in this form of my invention the flue and air intake conduits are vertically spaced instead of being located side by side as in Fig. 1. However, the important feature 45 is to arrange the open ends of the L's 25 and 26 in vertical alignment substantially in the central portion of the cylindrical housing 24.

The ends of the housing 24 are open as at 27 and 28 and provided with deflectors or baffles 27a and 28a, respectively, which may be secured to the walls of the housing by any suitable means such as brackets 29, said baffles extending across the open ends of the housing and spaced therefrom a predetermined distance to provide for 50 sufficient intake and exhaust.

This form of my invention provides an effective means of equalizing atmospheric disturbances, and as in the structure just described, permits the burner to create its own positive draft. 60 The hot products of combustion leaving the burner box 3 through flue 7 are conducted upwardly through the L 25 into the upper portion of the housing 24, being discharged through the space between the baffle 27a and the upper end 27 of the housing. Fresh air is drawn in through 65 the open lower end 28 of the housing, past the baffle 28a into the down-turned end of the L 26 and from thence through conduit 9 into the burner box.

70 Obviously, any wind disturbances are interrupted by the baffles 27a and 28a, and due to the

arrangement of the L's, their effect is equally distributed in the housing 24 so as to permit the uninterrupted operation of the burner.

While I have shown and described my present invention as particularly adapted for use in connection with liquefied petroleum gas vaporizers of the type shown and described in my copending applications, it is to be understood that I do not intend to limit myself in any way to this particular use. Obviously, this invention may be used with equal effect in connection with any type of gas burner which is subjected to changing atmospheric conditions, such for example as orchard heaters and other burner equipment which is located out of doors and exposed to the elements.

From the foregoing it is believed that the construction and operation of my invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit of my invention as set out in the following claims.

What I claim and desire to secure by Letters Patent is:—

1. The combination with a fuel burner having an air inlet conduit and a flue, of a draft equalizer comprising a housing, exhaust openings and intake openings in said housing, baffle means adjacent said openings, the outer ends of said air conduit and flue projecting through the wall of said housing and terminating within the latter, and separate means for preventing the admixture of flue gases with the fresh air drawn into said conduit.

2. In combination with a fuel burner, a closed burner box, an air inlet conduit leading into said box, a flue leading from said box, a draft equalizer, including a housing, intake and exhaust openings in said housing, baffles adjacent said openings, said conduit and flue leading into said equalizer, and means within said equalizer for preventing the admixture of flue gases with the fresh air drawn into said conduit.

3. The combination as claimed in claim 2 wherein said housing comprises a vertically disposed body portion open at its upper and lower extremities, said flue terminating in an upturned end and said air inlet conduit terminating adjacent said flue in a down-turned end.

4. The combination as claimed in claim 2 wherein said housing comprises a vertically disposed body portion open at its upper and lower extremities, said flue terminating in an upturned end and said air inlet conduit terminating below said flue and in vertical alignment therewith, in a down-turned end.

5. The combination with a fuel burner having an air inlet conduit and a flue, of a draft equalizer comprising a housing, a vertical partition dividing said housing into an inlet chamber and an exhaust chamber, said air inlet conduit being in communication with said air inlet chamber, said flue being in communication with said exhaust chamber, inlet and exhaust openings for said chambers, and baffle means adjacent said openings, said chambers being arranged in indirect communication with one another whereby atmospheric disturbances are equally distributed throughout said housing but the admixture of flue gases with the fresh air is prevented.

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