

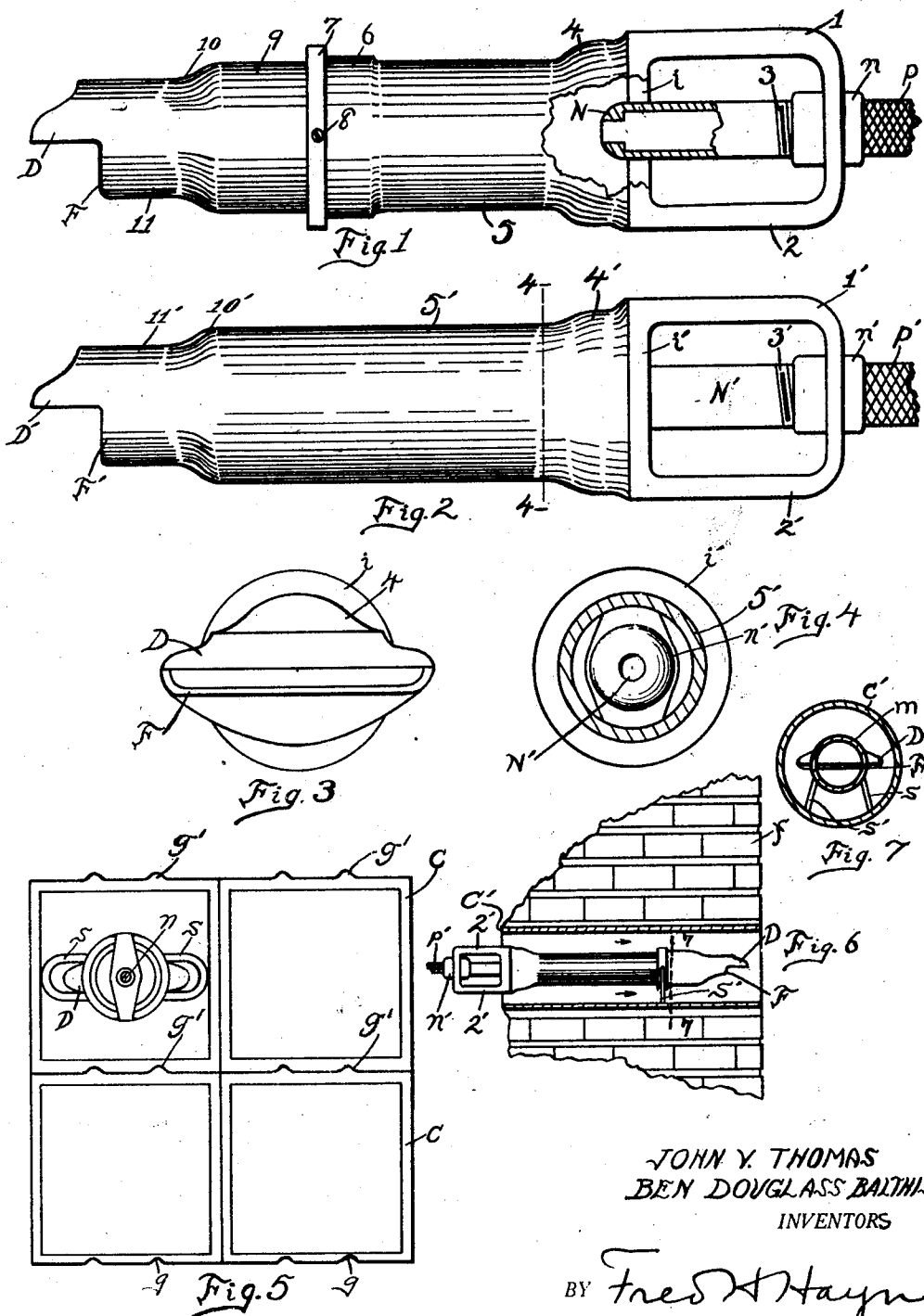
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GAS BURNER

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GAS BURNER.

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Our invention relates to an improvement in furnaces and burners therefor, and has as an object to simplify and render more efficient the operation of said furnaces and burners now on the market and in general use.

Many of the gas burners on the market are complicated in structure, and accordingly are expensive to manufacture. Moreover, they are wasteful in gas consumption, and do not adapt themselves for variation in gas pressure. It may also be stated that it is almost impossible in the known devices to obtain a proper and effective mixture of air and gas, resulting in the deposit of carbon in the furnace and resulting in a serious loss in efficiency. A still further objection to the burners on the market is that they frequently become clogged, which also results in a marked decrease in efficiency.

By the use of our invention all the aforesaid objectionable features are overcome, said invention comprising an exceedingly simple, efficient, durable and inexpensive device, which is economical in gas consumption, which will effectively eliminate all carbon deposits, and which is almost impossible to get out of order.

It is an object of our invention to produce a burner in which the number of parts is reduced to a minimum, and which may be installed in furnaces, for example, at a minimum cost, and at the same time afford an economical means for running said furnaces at full capacity and efficiency.

Another object of our invention is to provide a gas burner in which a gas nozzle is mounted in a frame which has associated therewith an air intake member affording a free and unobstructed flow of air, which air is deflected and concentrated about said nozzle, and directed forwardly in a line with the flow of gas from said nozzle, the resulting mixture of air and gas being conveyed to an outlet chamber in which said mixture is deflected and concentrated to an elongated flame nozzle which has associated therewith a deflecting member so that said flame will be spread out fan-shaped.

A still further object of our invention is to provide a gas burner in which an elongated casing, either sectional, or constructed in one continuous piece, is associated with a gas nozzle carrying frame, said casing affording a means for concentrating the flow

of air about said nozzle, and deflecting said air to a mixing chamber in said casing, in a straight line with the flow of the gas issuing from said nozzle, the resulting mixture being introduced into an outlet chamber, which chamber is flattened so as to form a concentrated mixture in order that an elongated flame may be produced, which flame is spread out fan-shaped by means of a flame deflecting member.

Another object of our invention is to position our improved burner within a circular or other shaped member to provide an additional air supply in order that a more thorough and intimate mixture may be provided for combustion, thus effectively eliminating all danger of carbon deposit.

It is also within the province of our invention to arrange our improved burners in series or in multiple so that any desired number may be used, especially where a single burner will not be sufficient to produce the heat required. As is well known, it is not practical to force a burner beyond its critical point of efficiency, and it is therefore necessary to install a burner of a larger size, or, as just suggested, provide an added number of such burners. As will be obvious, such a feature is contemplated by the use of our invention.

A further object of our invention is to equip our improved burner with a means for supporting the same within one or more tubular or other shaped air members, such air members being positioned within one of the walls of the furnace with which said burner is adapted to be associated.

It is moreover within the province of our invention to provide an assembly of rectangular or other shaped air members, which members, if desired, may be equipped with a means for readily assembling and disassembling such air members; such means, if preferred, comprising any desired number of groove and projection connections, positioned on said members wherever needed.

Further objects and advantages of our invention will become more apparent as the description thereof proceeds.

Reference is had to the accompanying drawings in which similar reference characters denote similar parts. In the drawings, Fig. 1 is a side elevational view of our improved burner, partly broken away to disclose the internal construction,

Fig. 2 is a similar view of a modification, Fig. 3 is an end elevational view of Fig. 1, looking from left to right,

Fig. 4 is a cross-sectional view of Fig. 2 on the line 4—4,

Fig. 5 is an end view of an assembly of air members which may be used in connection with our improved burner, one of such burners being shown in position in said members,

Fig. 6 is a fragmentary sectional view showing the use of our improved device in connection with a circular air member, said member being shown in position in one of the walls of a furnace, and

Fig. 7 is a cross-sectional view of Fig. 6 on the line 7—7.

Describing our invention more in detail, our improved burner comprises an elongated casing, either sectional or formed in one continuous piece, and constructed of suitable material, which casing has associated therewith a frame of any preferred shape, preferably consisting of an upper member 1 and a lower member 2, in which frame a gas nipple *n*, to which a gas pipe *p* is attached, is mounted in any preferred manner, a gas nozzle *N* being screwed or otherwise mounted in said nipple, the numeral 3 designating the threads.

To provide for a free and unobstructed flow of the air, as will be observed from Figs. 1 and 2, the frame housing the nozzle *N* is of such a form as to provide for said air flow. Moreover, the air intake member *i* is sufficiently large, and the nozzle *N* is positioned concentrically with said air intake so that an intimate mixture of gas and air may be provided, said gas nozzle projecting into an air chamber 4, shaped as shown, to provide for an air flow in a straight line with the flow of gas issuing from said gas nozzle. It will also be noted that the air chamber 4 is tapered so as to concentrate and deflect the air to the mixing chamber 5, which is preferably, though not necessarily, cylindrical in shape.

The arrangement thus far described, it will be noted, provides for the formation of an effective mixture of air and gas so that the resulting flame will be thoroughly efficient and will effectively avoid the deposit of soot or unconsumed carbon, which, as is well known, is a non-conductor of heat, and renders the effect of the flame inefficient.

The end 6 of the mixing chamber 5, as shown in Fig. 1, is somewhat enlarged to provide for the reception of the end 9 of the outlet chamber 11, a suitable collar 7, either integral with or secured to the end 6 of the mixing chamber 5, being provided for convenience of assembly. The collar or annular projection 7 has positioned therein a set screw or other member 8 to provide a means for more effectively holding the out-

let chamber in position, which outlet chamber if desired, may be associated with the mixing chamber 5 by means of a driving fit.

The outlet chamber is preferably, though not necessarily, cylindrical in shape, and has its flame end flattened or elongated to provide a means for deflecting and concentrating the mixture so that the resulting flame, when said mixture shall have been ignited, will be fan-shaped, thus affording a very efficient and intense flame. If desired, the outlet chamber may be provided with a concentrating or deflecting portion whereby the mixture may be efficiently concentrated and deflected to the flame orifice or nozzle *F*, which is preferably elongated in shape, as shown in Fig. 3.

To form an additional means for deflecting the flame, a deflector or deflecting member *D* either integral with the member 11, or associated therewith in any desired manner, is provided. It will be clear that the provision of said deflector, as well as the shape thereof, and the shape of the flame nozzle or orifice *F*, afford an excellent means for providing a thoroughly efficient flame.

In the form of our invention shown in Fig. 2, we have provided a burner in which the casing is constructed of one continuous piece, either cast out of any desired material, such as iron, aluminum, etc., or constructed in any manner that in practice may suggest itself.

This form of our invention has also a frame, composed, if desired, of an upper member 1' and a lower member 2', and in which frame a gas nipple *n'* is suitably mounted, which nipple has associated therewith a gas pipe *p'*. The gas nozzle *N'* is screw-threaded as indicated at 3' into the nipple *n'*, providing a means whereby the distance to which the gas nozzle is projected into the air chamber 4' may be adjusted.

As in the form shown in Fig. 1, the nozzle *N'* is concentric with an air intake *i'*. The mixing chamber 5' is also preferably, though not necessarily, cylindrical in shape, and the outlet chamber 11' is provided with a deflecting and concentrating portion 10', said outlet chamber terminating in a flame nozzle or orifice *F'*, which outlet chamber and flame nozzle or orifice has also associated therewith a deflecting member *D'*, the entire burner, except the gas nozzle and nipple being in this form of one integral construction.

In Fig. 5 we have shown an assembly of air members, which, if desired, may be used in connection with our improved burner. The air members *c* are shown square in cross-section, though it is obvious that they may be of any shape found in practice desirable. By the use of such air members an

additional air supply is provided, insuring an intimate and thorough mixture of gas and air, and providing for an ample air supply to insure that there will be no deposit of carbon in the furnace *f*, with which the invention is to be associated.

The members *c* are each provided with any convenient number of grooves *g* and projections *g'* associated therewith to provide for a ready assembly and disassembly of said air members, which members may be of any number needed. It will be clear that, if desired, the sides as well as the tops and bottoms of said tubes or members may be provided with such grooves and projections.

To provide a means for mounting the burner within the air members, the walls thereof may be equipped with a supporting means comprising a pair of curved supporting devices *s*, either integral with or secured to said walls in any preferred manner; and if desired, such devices may be located at the top and bottom of said members, or indeed on all walls thereof.

In use, the air members are positioned within the wall of the furnace, additional members being supplied as needed, by slipping the projections *g'* within the grooves *g* of the members.

In the form shown in Fig. 6, a circular air member *c'* is used in connection with the burner and the furnace *f*, the burner being positioned as shown, with its flame end within said air member. This feature is important since the aspirating effect of such a construction produces the results hereinbefore explained; intimate and proper mixture, highest efficiency and total lack of carbon deposit.

As shown in Fig. 6, the burner is adjustably mounted in the air tube or member *c'*, a pair of pegs *s'*, screwed or otherwise associated with the casing of the burner, being provided for this purpose. But it will be clear that other means for adjustably mounting the burner in the air tube may be substituted for that shown and described.

While we have thus described our invention with great particularity, it will be obvious that the same may be modified throughout a wide range. We therefore do not propose to be limited to the exact details of construction shown and described, but reserve the right in practise to make any and all modifications thereof that fall within the scope of the appended claims.

We claim as our invention:

1. In an apparatus of the class described, an air tube, a support in said tube and adapted to be longitudinally adjusted therein, a burner in said tube and adapted to be adjusted with said support, said burner comprising a skeleton frame, a gas nozzle extending through said frame, a casing extending from said frame, said nozzle projecting

in said casing and being adapted to be adjusted relative to the longitudinal length of said casing, said casing comprising a tapered inlet portion, a cylindrical portion and a tapered outlet portion, and a flattened flame nozzle extending in direct horizontal alignment with and from said outlet portion.

2. In a combined gas burner and air aspirating apparatus, a set of air tubes, means associated with said tubes for preventing their relative movement, a gas burner in each of said tubes, each of said burners comprising an elongated skeleton frame, a gas nozzle extending through said frame, means for adjusting said nozzle longitudinally in said frame, said frame defining openings whereby the air may be introduced sideways thereof, a casing integral with said frame, said casing comprising a tapered inlet portion, a cylindrical portion, and a tapered outlet portion, an elongated flame nozzle, extending from said outlet portion and positioned between the upper and lower arcs of said outlet portion, and a frame deflecting element on said nozzle and also positioned between said arcs.

3. In a combined gas burner and air aspirating means, an air aspirating means comprising an air aspirating tube, a casing in said tube, adjusting means in said tube for supporting said casing in said tube and adjusting said casing along the longitudinal length thereof, said casing being provided with means whereby air may be introduced laterally and then longitudinally thereof, a gas nozzle projecting in said casing, said casing being gradually tapered from its air inlet to said gas nozzle to concentrate the entering air about said gas nozzle, said casing having a cylindrical portion for mixing the gas and air and a tapered outlet portion, and a fan-shaped flame nozzle projecting forwardly in alignment with and laterally from said outlet portion.

4. In a combined gas burner and air aspirating means, a plurality of air tubes, a gas burner adjustably positioned in each of said tubes, tube wall engaging means in each of said tubes for adjustably supporting said burners, each of said burners comprising a casing provided with means for admitting air laterally thereto, a gas nozzle adjustably positioned within said means, said casing comprising a tapered inlet portion, a cylindrical portion, and a tapered outlet portion, a fan-shaped flame nozzle projecting forwardly in alignment with and laterally from said outlet portion, and a flame deflecting means extending from said outlet portion and positioned above said flame nozzle.

In testimony whereof we have signed our names to this specification.

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