

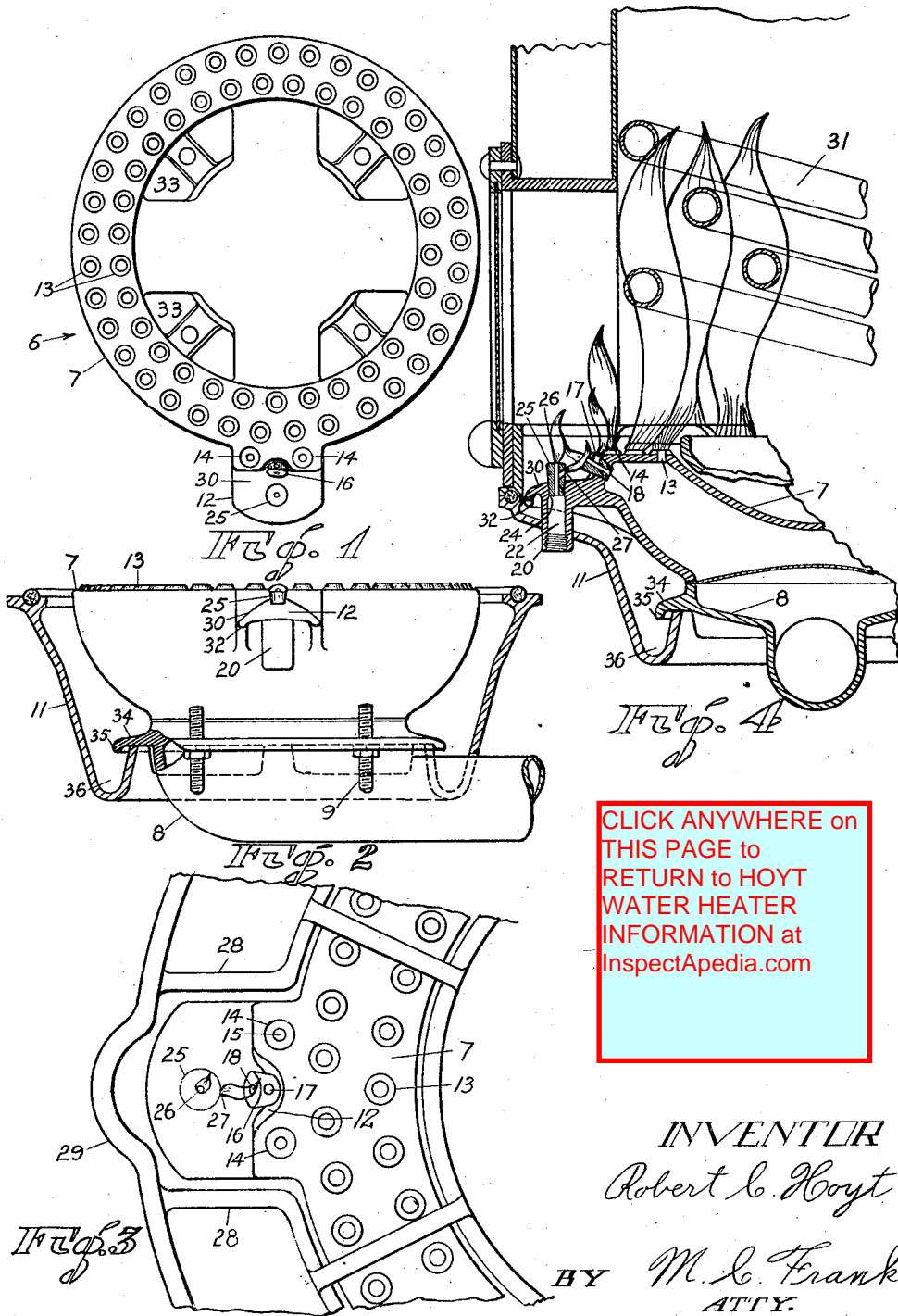
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WATER HEATER GAS BURNER

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UNITED STATES PATENT OFFICE.

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WATER-HEATER GAS BURNER.

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My invention relates to gas burners for water heaters, and it has special reference to burners adapted to be used in connection with automatic water heaters in which the water circulates through a unit of heating coils.

In such heaters considerable difficulty has hitherto often been experienced in the lighting of the burner from the flame of the pilot light, which in many instances is extinguished by draft, or by the falling thereon of water drops formed by condensation on the outside of the heating coils, or by the ash of the products of combustion, which ashes tend to collect on the coils and about the pilot light tip. Also, if the pilot light is at some distance from the burner, sufficient time may elapse before the gas from the burner reaches the flame of the pilot light, so that, should it happen that air has been mixed in proper proportion with the gas that fills the heater shell, a very dangerous explosion may be caused thereby.

Furthermore, in such heaters that I am familiar with, water drip and ash have been given no special attention and consequently are unchecked as they fall upon the burner and the pilot light and continue on their way down to the floor below the heater, where they soon form an objectional wet mass which discolors the floor and otherwise causes annoyance to the operator or housekeeper.

My invention has for an important object to eliminate all liability to extinguishment of the pilot light in an automatic water-heater, either as a result of the falling of ash or the falling of drops of condensation thereon.

Another object is to lead the residue of the products of combustion and the products of condensation, which may fall and collect upon the burner and the pilot light, to a collection chamber below the burner so as to safeguard the floor below the heater from damage and to preserve a neat appearance thereof.

Another object of great importance is to provide the burner with a tip and arrange it in such a manner with the pilot light tip so that instantaneous ignition will result, and thus overcome the heretofore dangerous gap of time before the gas from the main burner is ignited.

A further object is to arrange the burner and the pilot light in an automatic water-heater so that the flame can not be extinguished by back draft through the heater or by other causes, and so that a heater equipped with a burner arrangement of my invention will require only a minimum of attention and be practically very safe in the hands of unskilled persons such as in dwellings where it primarily is designed for installation.

Other objects and advantages of my invention will appear from the following detailed description of the same taken in connection with the accompanying drawings, but it should be understood that the description and the drawings refer only to a preferred embodiment of my invention, and that the invention may be applied in various other modifications which come under the interpretation of the appended claims following this specification, and without departing from the spirit of the invention.

In the drawings:

Figure 1 is a plan of the burner and the pilot light;

Fig. 2 is an elevation of Fig. 1, and includes the lower part of the base in section and shows its supporting relation with the burner;

Fig. 3 is an enlarged, fragmental plan, showing the arrangement of the pilot light tip and the tips in the burner, the roof in which the pilot light tip is secured, and the walls on the upper part of the base that protect the pilot light from the effect of draft;

Fig. 4 is a sectional elevation through a part of the burner and the pilot light extension thereof and shows the openings in the tips of the pilot light and the burner, and also the beaded flange under the roof at its edges and that leads the drops of condensation to the collection chamber below the burner. The jacket of the heater, water coils, and pilot light housing and the upper part of the heater base are shown fragmentally.

Referring to the drawing and figures thereof;

The numeral 6 in the preferred embodiment of my invention indicates a burner for an automatic water heater and it comprises

an upper, annular portion 7 and a lower portion 8, secured thereto in any approved manner as with bolts 9.

The burner 6 has the usual annularly arranged tips 13 on its top, and adjacent thereto is an extension 12 having a pair of tips 14 with openings 15 therein communicating with the interior of the burner. These openings 15 are preferably smaller than the openings in the tips 13 in the annular portion 7. Between the two tips 14 is a third tip 16 provided with two openings 17 and 18 also communicating with the interior of the burner 6, the latter tip preferably being of lava or some other non-corroding and heat-resisting substance, and arranged to fit tightly in the burner so that the opening 17 is directed virtually perpendicularly, while the opening 18 is slanting outwardly in the mid-sectional vertical plane of the burner 6 and the extension 12. The openings 17 and 18 are not required to be so large as the openings 15 in the tip 14, a hole of a size made with a No. 46 drill, U. S. drill standard, being sufficient to form the opening 17, and a hole of a size made with a No. 50 drill being sufficient to form the opening 18.

On the underside of the extension 12 and outside of the tip 16 is formed a boss 20, adapted to extend through an opening in the wall of the heater base 11. The boss 20 has centrally therein a bore 22, which has threaded connection with a gas-inlet pipe (not shown), but is non-communicative with the interior of the burner 6 Fig. 4. Coaxial with the bore 22 and in the said mid-sectional vertical plane of the burner 6 and the extension 12, the extension has therein a smaller bore 24, communicating with the bore 22 and adapted to receive therein a tight-fitting tip 25 of a substance similar to that of the tip 16.

In the tip 25 are, as in the tip 16, two openings 26 and 27, which communicate with the bore 22; and the openings are so arranged, and the tip should be so placed, in the bore 24 that, while the opening 26 is directed virtually perpendicularly, the opening 27 is slanting inwardly in the said mid-sectional plane of the burner 6 and the extension 12. I prefer also to make these openings 26 and 27 smaller than the openings 17 and 18 in the tip 16, and I have found in my researches that, if each of the openings 26 and 27 is as large as a hole made with a No. 56 drill, U. S. drill standard, the size is particularly adapted for a satisfactory operation of the burner when the openings in the tip 16 also are of the size previously specified.

The tip 25, communicating with the bore 22, which, as before stated, is connected with a gas-supply source, not shown, independently of the burner 6, thus comprises the pilot light for the burner. In order to pro-

tect this pilot light from draft the base 11 is provided with inner wall-portions 28, one on each side of the extension 12 and an outer wall-portion 29. For further protection of the pilot light, the top of the extension 12, beyond the tips 14 and 16, is lower than the top of the extension at the tips 14 so that the tip or pilot light 25 also is below the tips 14 and 16. By this arrangement the burner 6 also serves as a means for shielding the pilot light from draft sweeping over the burner toward the pilot light.

Besides being lower than the top of the extension 12 at the tips 14, the top of the extension, beyond the tips 14, forms a sloping roof 30, which is adapted to cause such drops of condensation and such ashes or unburned products of combustion as fall from the heating coils 31, shown fragmentally in Fig. 4, and are carried by air currents or otherwise to the extension 12, to slide past the pilot light. It has also a further purpose of checking down draft from the interior of the heater and thereby preventing it from extinguishing the pilot light, such draft taking the course around the burner and inside of the hollow base 11 and finding its outlet at the bottom of the base.

Under the roof 30 the extension is provided with a beaded flange 32, which follows the edge of the roof from its extremity and slopes downward towards the burner, so that the products of condensation and combustion that fall on the roof will follow the bead and will be led away from the opening in the base for the boss 20 and therefore can not escape therethrough. Also, such products as fall upon the burner and take an inward course, will go through openings 33 formed at the bottom of the upper portion 7, and such products as take an outward course, including products falling on the roof 30, will follow the outer wall of the upper portion 7. In either case, they are collected upon an annular flange 34 integral with the lower portion 8. By a peripheral bead 35 on the underside of the flange, which bead extends over an annular collecting chamber 36 in the bottom of the base, such products are then led into the chamber from which by the heat from the burner the products of condensation are vaporized and escape upwardly through the heater vent, not shown, while the unburned products of combustion collected in the chamber are easily removed therefrom.

It should be observed that by the arrangement of the pilot tip 25 and the tip 16 relative to each other and to the tips 14, when the pilot light is burning and when the burner valve, not shown, is open, a small stream of gas will be directed towards the flame of the pilot light from the opening 18, while another stream of gas will be directed upwardly from the opening 17 between the

streams of gas issuing from the tips 14. The gas issuing from the opening 18 will then be ignited by the flame from the slanting opening 27, or, if it should pass that flame without being ignited, it will be ignited by the flame from the perpendicular opening 26 of the pilot light, and the gas issuing from the tips 14 in its turn will be ignited by the flame from the perpendicular opening 17 in the tip 16 and thus ignite the gas issuing from the tips 13 of the burner, thereby effecting a sure ignition of the burner 6 instantaneously.

If, on account of their vertical direction, the openings 17 and 26 in the respective tips should become clogged by ash or otherwise, so that gas can not escape therethrough, the slanting of the openings 18 and 27 prevents to some extent the ash or other products from entering the openings 18 and 27, and thereby assists in maintaining the burner in operative condition for a maximum length of time.

Having thus described my invention, I claim as new and desire to secure by Letters

Patent of the United States the following:

1. In a water heater having a base provided with an annular chamber at the bottom thereof for the collection of products of condensation and unburned products of combustion from the heater, a burner connected with a gas-supply source and secured within said base, said burner having an annular flange integral therewith and provided with a peripheral bead on the underside of said flange extending over said chamber.

2. In a water heater of the character described, a base forming an annular trough and a burner resting on the inner edge thereof and having a substantially closed outer wall shaped to guide products of condensation into the base, the outer wall of the base rising alongside of and in spaced and proximate relation to the wall of the burner so as to completely surround the same.

In testimony whereof I affix my signature.

ROBERT C. HOYT.