R. C. FRAMPTON.

BURNER.

APPLICATION FILED AUG. 27, 1912.

1,086,150.

Patented Feb. 3, 1914.

FIG.4.

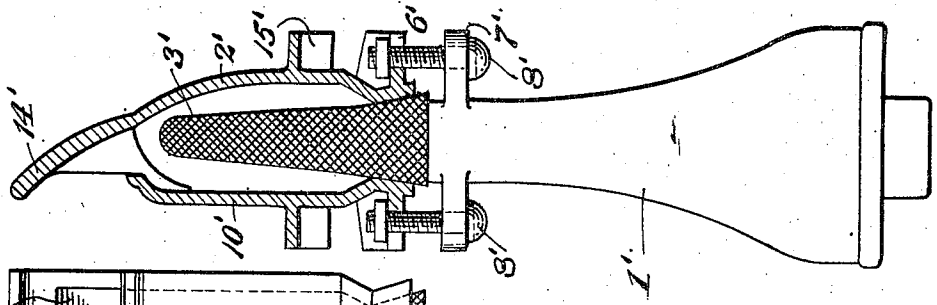


FIG.3.

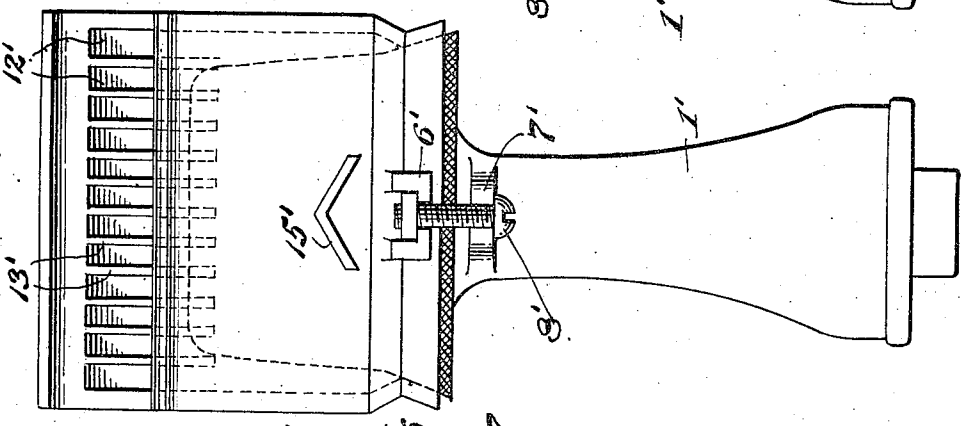


FIG.2.

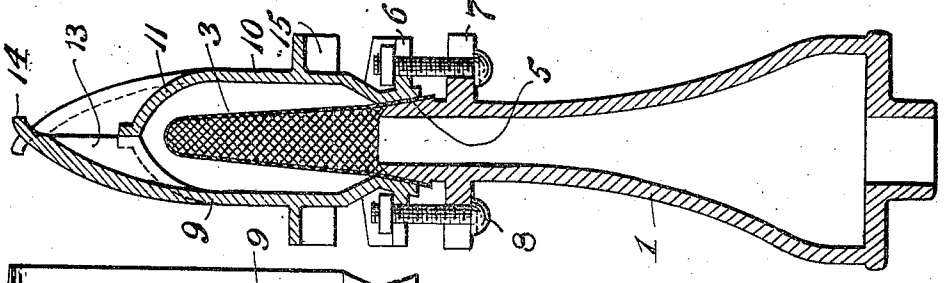
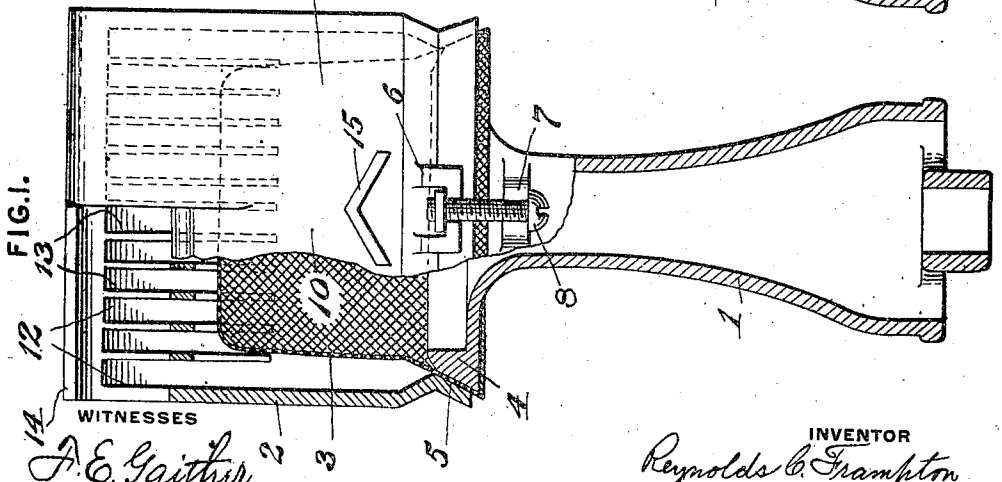


FIG.1.



WITNESSES

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BURNER.

1,086,150. Specification of Letters Patent. Patented Feb. 3, 1914.

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To all whom it may concern:

Be it known that I, REYNOLDS C. FRAMPTON, of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Burners, of which the following is a specification.

The invention relates to burners particularly adapted for use in what are known as instantaneous water heaters, although capable of use in other relations. It has for its primary objects; the provision of a burner in which the number of parts is reduced to a minimum, it being possible to make the entire burner head in one piece instead of employing separate cap or side plates for clamping the gauze, as has heretofore been done; the provision of a burner having a foraminous burner or gauze shield of maximum area; the provision of a burner in which the burner or gauze shield is entirely free from warping and the shield is free to expand and contract without buckling or cracking; the provision of a shield in which the edge of the shield held by the head is at a maximum distance below the flame and in which the length of edge held by the head is reduced to a minimum, thus maintaining the shield at a low temperature and reducing the danger of back-firing; the provision of a burner in which there is no joint in the head for holding the foraminous shield exposed to the water of condensation; the provision of a burner in which a cross fire is secured adapted to strike the tubes of the heater in such a way as to secure a high degree of heating efficiency; the provision of a burner in which the securing devices or bolts for the head are so removed from the flame as to be free from its action, and in which the burner head will remain securely in place even in case of failure of the securing bolts; and the provision of a burner which can be cheaply constructed, easily assembled and disassembled, and which will operate for a long period at a high degree of efficiency. Two of a number of possible embodiments of the invention are illustrated in the accompanying drawings, wherein—

Fig. 1 is a front elevation of the burner, with a portion of the burner head in section. Fig. 2 is a transverse section through the burner. Fig. 3 is a front elevation of a modified type of burner, and Fig. 4 is a partial side elevation and partial section of the burner of Fig. 3, the section being taken through the burner head.

The lower portion 1 of the burner comprises a Bunsen mixing tube or chamber, which may be of any approved form, and to the lower end of which a mixture of gas and air is supplied in the usual manner; 2 is what may be termed the burner head; and 3 is the burner shield which may be of gauze or any other desired material, provided with a large number of openings or perforations.

The upper end 4 of the mixing tube or chamber 1 is expanded as indicated in Fig. 1, and the outer surface of this expanded portion 4 is tapered as indicated at 5. The foraminous shield or gauze 3 is made in what may be termed a reverse cup or tent shape, and the lower edge of this cup shaped shield 3 fits over the tapered portion 5 of the upper end of the mixing tube or chamber 1. The lower inner edge of the burner head 2 is also tapered to correspond to the taper of the surface 5, and when this burner head is fitted over the upper end of the mixing tube as indicated in Figs. 1 and 2, the lower edge of the burner shield 3 is securely clamped between the opposing tapered surfaces. In order to secure the burner head 2 rigidly in position, such burner head is provided with a pair of lugs 6 which oppose a pair of lugs 7 at the upper end of the tube or chamber 1, and between the two sets of lugs extend the stove bolts 8, the lugs 6 being provided with square recesses as illustrated, in order to prevent the rotation of the nuts upon the stove bolts.

Each side of the burner head 2 consists of a wall one half of which, 9, extends to the top of the head, and the other half of which, 10, curves in at its upper end as indicated at 11 (Fig. 2), to provide for the perforations 12, such perforations being separated from each other by means of the ribs 13. It will be seen that by this arrangement the burner head is made to discharge in two directions, and that the two discharges are not opposite, but are entirely separate, the blank wall on one side of the burner head coming opposite the perforated wall on the other side. On each side the upper portion 14 of the blank wall overhangs the outlets 12, 12, so that a guard is formed, and the openings protected from the water of condensation.

The advantages incident to the construction just described will be readily apparent to those skilled in the art. It will be noted that all of the clamping of the shield 3 occurs at the lower edge of such shield and at a point removed a maximum distance from the flame. As a result, the shield does not become as hot as in those cases where the shield is clamped adjacent the flame. The coolness of the shield 3 is also conserved by reason of the relatively short length of edge of the shield which is in engagement with the heated burner head. The ordinary burner plate is clamped at each of its four edges, so that in proportion to its area a relatively long edge is in engagement with the heated cap plate ordinarily employed. The clamping of the shield 3 in the manner illustrated is further advantageous in that the shield is free to expand and contract without any stretching or buckling action tending to destroy the gauze or impair its usefulness. The life of the foraminous shield is therefore materially increased, and the tendency of backfiring due to overheating of the foraminous shield is entirely eliminated.

By reason of the taper engagement at the lower end of the burner head a very tight joint can be secured at this point, thus reducing the amount of leakage, which leakage is also comparatively slight, as opposed to that of the ordinary burner, due to the fact that the length of the joint is very much less than in the ordinary type of burner wherein a plate is employed which is clamped around its entire circumference. It will also be seen that the weight of the burner head 2 tends to maintain a tight joint, and this fact taken in connection with the taper fit insures the maintenance of the burner head upon the mixing tube even though the bolts 8 should become loosened or displaced. However, the holding bolts in this type of construction are not liable to displacement or breakage, as they are located at a point far below the zone of greatest heat, and their ends are protected from the water of condensation by means of the shields 15. As a result these bolts are in nearly all cases maintained in good condition, even after long service, and little difficulty is experienced in removing these bolts when it is desired to remove and clean the burner plate. One of the principal advantages incident to the construction resides in the large area of shield which it is possible to use, the top and ends of the cup shaped member being available to permit the passage of gas just the same as the face portions of the shield which come opposite the walls 9 and 10. This is a most desirable feature, as burners of this type are ordinarily reduced to low capacity in the course of time, due to the blocking up of the perforations in the gauze. The excess area of gauze in my construction is such that the openings through the gauze may be clogged to a considerable extent before the capacity of the burner is reduced to such an extent that cleaning is required. A large extent of shield area is thus secured without increasing the size of the burner beyond reasonable limits. It will be further observed that the joint at which the gauze is clamped in my burner is entirely protected from the water of condensation from above.

The feature of having the burner head discharge in opposite directions with the two bodies of flame entirely separated is most desirable in that it not only provides for the application of the heat to the water tubes above the burners in the most advantageous manner, but secures a high efficiency in combustion, access of air to the two flames being more ready than where a single body of flame discharging in one direction is used. Various other advantages incident to the construction will be apparent to those skilled in the art.

The modification illustrated in Figs. 3 and 4 is substantially the same as the structure of Figs. 1 and 2, with the exception that all of the discharge occurs from one side of the burner head instead of being divided as in the construction of Figs. 1 and 2. In this construction of Figs. 3 and 4, the burner head 2′ is held securely upon the mixing tube 1′ by means of the stove bolts 8′ passing through the lugs 6′ and 7′, the bolts being shielded by the members 15′ just as in the other type of construction. The flame guard or shield 3′ is constructed substantially the same as in the other type of construction, and is held between the tapered surfaces at the upper end of the mixing tube and the lower end of the burner head. The discharge of the combustible mixture occurs entirely through the one side 10′ of the burner head, the outlet slots 12′ being separated by the ribs 13′, and the openings 12′ are shielded from the water of condensation, by the overhanging portion 14′. This type of construction has substantially all of the advantages of the construction of Figs. 1 and 2, with the exception of those due to the discharge in opposite directions as heretofore explained.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is the following:

1. In combination in a burner, a mixing chamber having an open top, a foraminous shield having substantially upright side walls fitting over the said open top and receiving the discharge therefrom, and a burner head fitting over the said shield and having imperforate upright side walls with such walls spaced away from the shield and with a discharge opening in its upper portion

above the shield and with its lower edge engaging and clamping the lower edge of the shield in position.

2. In combination in a burner, a mixing chamber having an open top, a foraminous shield of reverse cup shape fitting over the said open top and receiving the discharge therefrom, and a burner head fitting over the shield and having substantially upright imperforate side walls and a discharge opening at its top.

3. In combination in a burner, a mixing chamber having an open top and having its outer surface tapered, a foraminous shield of reverse cup shape fitting over the said open top and receiving the discharge therefrom, and a burner head fitting over the shield and having substantially upright imperforate side walls and a discharge opening at its top and having its lower edge in clamping engagement with the lower edge of the shield, the said burner head fitting over the top of the said mixing chamber being tapered interiorly with the edge of the shield between the burner head and mixing chamber.

4. In combination in a burner, a mixing chamber having an open top, a foraminous shield having substantially upright side walls fitting over the said open top and receiving the discharge therefrom, a burner head fitting over the said shield and having imperforate upright side walls with such walls spaced away from the shield and with a discharge opening in its upper portion above the shield, and with its lower edge engaging and clamping the lower edge of the shield in position, and securing means intermediate the lower end of the head and the upper end of the mixing chamber.

5. In combination in a burner, a mixing chamber having an open top, a foraminous shield of reverse cup shape fitting over the said open top and receiving the discharge therefrom, a burner head fitting over the shield with its lower edge in clamping engagement with the lower edge of the shield and having imperforate side walls opposite the shield and a discharge opening from its upper portion, and securing means between the lower portion of the burner head and the upper portion of the mixing chamber.

6. In combination in a burner, a mixing chamber having an open top, a foraminous shield of reverse cup shape, telescoping over the said open top, a burner head with an upper discharge opening fitting over the shield with its lower edge telescoping over the lower edge of the shield and the upper edge of the mixing chamber and having imperforate side walls, and upright clamping bolts between the head and mixing chamber.

7. In combination in a burner, a mixing chamber having an open top with its outer surface tapered, a foraminous shield of reverse cup shape telescoping over the said open top, a burner head with an upper discharge opening fitting over the shield with its lower edge telescoping over the lower edge of the shield and the upper edge of the mixing chamber, and clamping bolts between the head and mixing chamber.

8. In combination in a burner, a mixing tube having an expanded upper end tapered on its outer surface, a foraminous shield of reverse cup shape fitting over said tapered surface, and a burner head having its lower edge engaging the lower edge of the shield outside of said tapered surface whereby the lower edge of the shield is clamped in position leaving the upper portion thereof free.

9. In combination in a burner, a mixing chamber having an open upper end, a foraminous shield of reverse cup shape seated upon such upper end, and a burner head having opposing upright side walls secured in position over the said shield, one of the said side walls having a perforation at its upper portion whereby a lateral discharge is secured, and being imperforate below such perforation and opposite the side wall of the shield.

10. In combination in a burner, a mixing chamber having an open upper end, a foraminous shield of reverse cup shape seated upon such upper end, and a burner head having opposing upright side walls secured in position over the said shield, one of the said side walls having a series of perforations at its upper portion whereby a lateral discharge is secured and being imperforate below such perforations and opposite the side wall of the shield.

11. In combination in a burner, a mixing chamber having an open upper end, a foraminous shield of reverse cup shape seated upon such upper end, and a burner head having opposing upright side walls secured in position over the said shield, the said opposing side walls being provided with perforations at their upper portions whereby a lateral discharge from both sides is secured and being imperforate below such perforations and opposite the side walls of the shield.

12. In combination in a burner, a mixing chamber having an open upper end, a foraminous shield of reverse cup shape seated upon such upper end, and a burner head having opposing upright side walls secured in position over the said shield, the said opposing side walls each having at its upper end a perforated portion and an unperforated portion with the perforated portion on one side opposite the unperforated portion on the other side.

13. In combination in a burner, a mixing chamber having an open upper end, a discharge chamber provided with foraminous shielding means comprising opposing up-

right walls with a connecting foraminous portion at the top, and a shell having imperforate upright portions opposite but spaced away from the upright walls of the shield fitting over the foraminous shielding means with outlet means at its upper portion, the said shell engaging the said shielding means only at its lower edge.

14. In combination in a burner, a mixing chamber having an open upper end, a discharge chamber provided with foraminous shielding means comprising opposing upright walls with a connecting foraminous portion at the top, and metal walls opposite the said foraminous walls each having at its upper end a perforated portion and an unperforated portion with the perforated portion on one side opposite the unperforated portion on the other side.

15. A flame guard or shield for a burner consisting of a foraminous sheet of material of reverse V shape having opposing substantially flat sides, and foraminous end closure means between the sides of the V.

16. In combination in a burner, a mixing tube, a burner head seated thereon, horizontal opposing flanges on the head and tube, an upright bolt extending through the flanges for securing the head to the tube, and a shield carried by the head and lying over the end of the bolt and adjacent thereto.

17. In combination in a burner, a mixing chamber having an open top, a foraminous shield of reverse cup shape fitting over the said open top and receiving the discharge therefrom, and a burner head fitting over the shield and provided with imperforate side walls and having a discharge opening at its upper portion.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

REYNOLDS CRAIG FRAMPTON.

Witnesses:
LÆTITIA A. MYERS,
ARCHIWORTH MARTIN.