Jan. 2, 1923.

1,441,051.

J. F. ADAMS.

GAS HEATER.

FILED JUNE 28, 1919.

2 SHEETS—SHEET 1.

Fig. 1

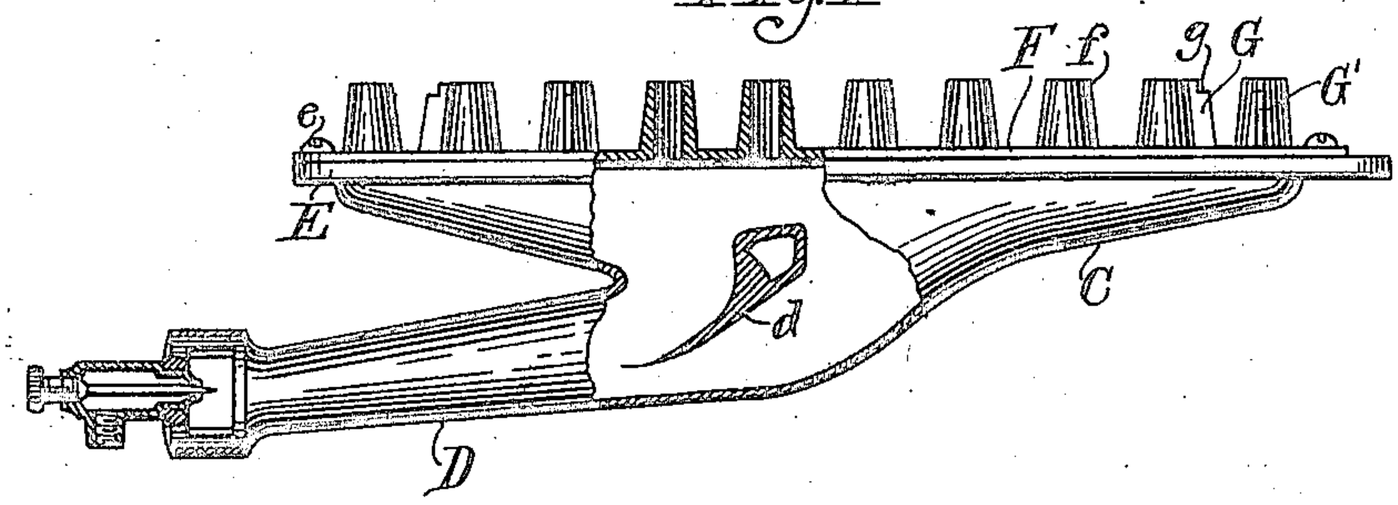


Fig. 2

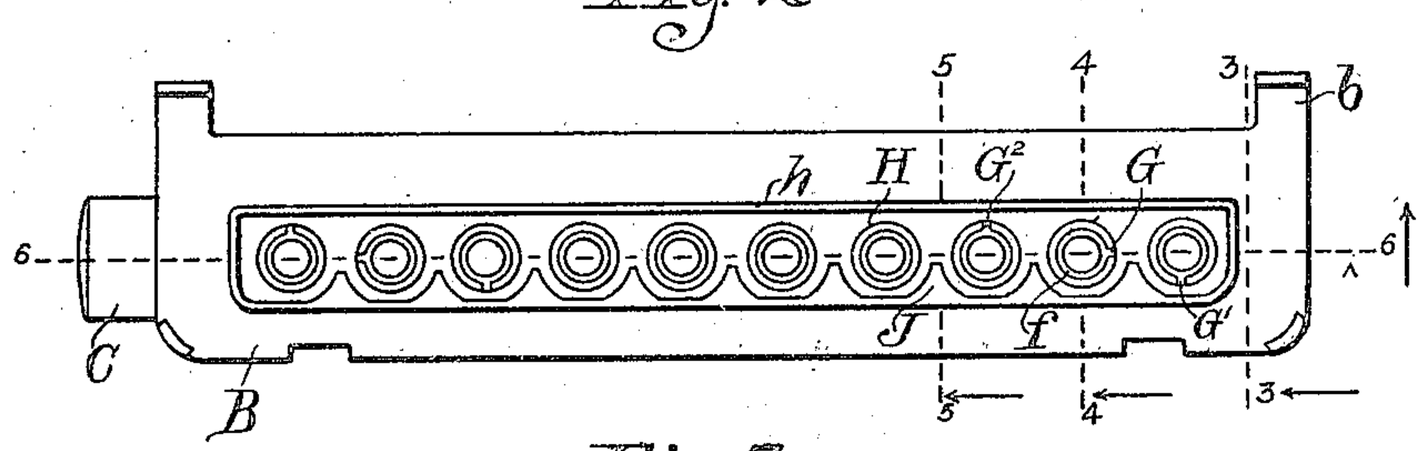


Fig. 3

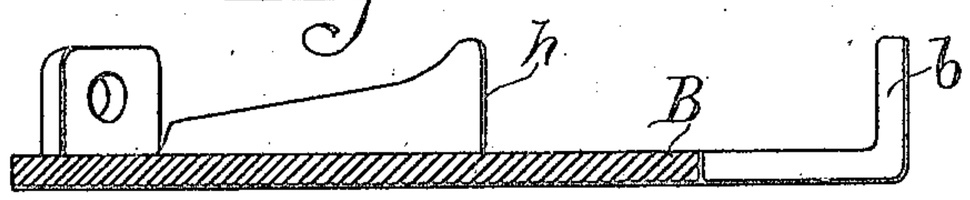


Fig. 4

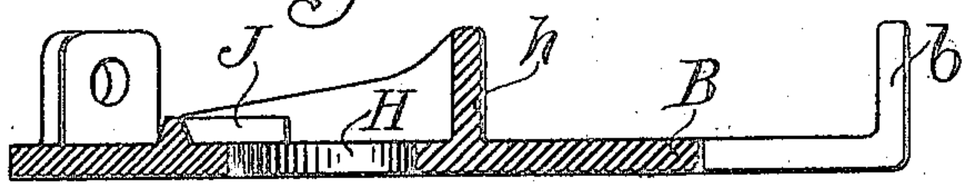
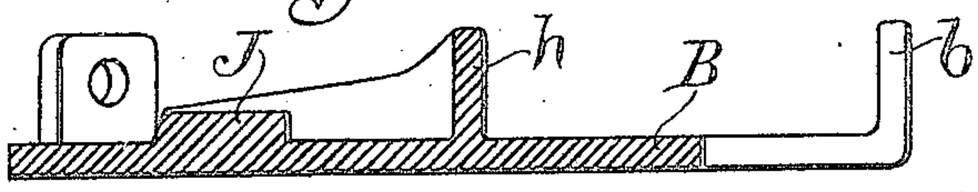


Fig. 5



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2 SHEETS—SHEET 2.

Fig. 6

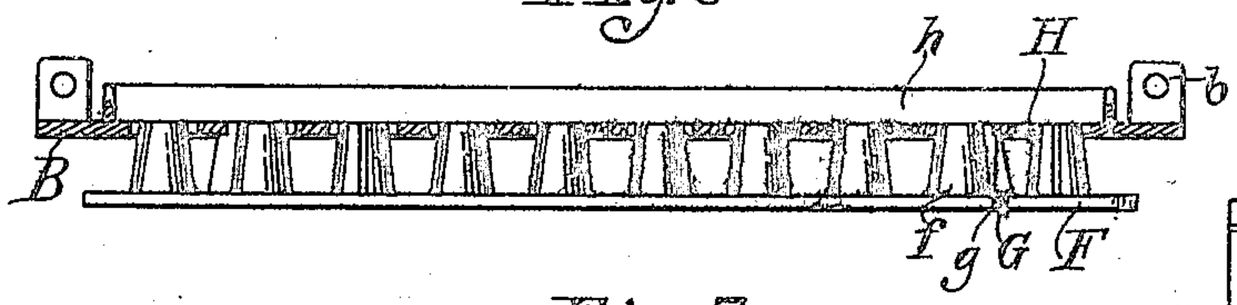


Fig. 7

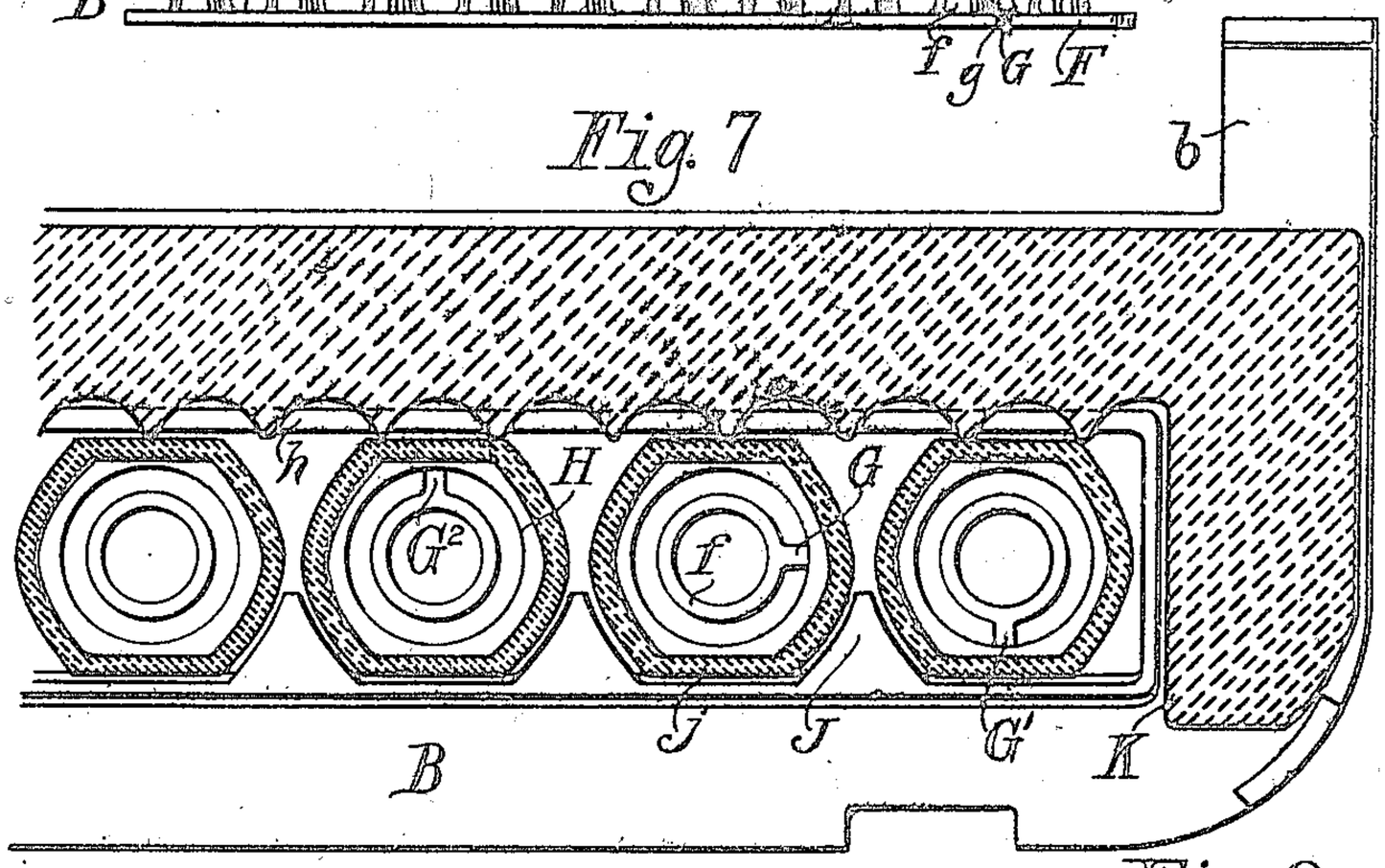


Fig. 8

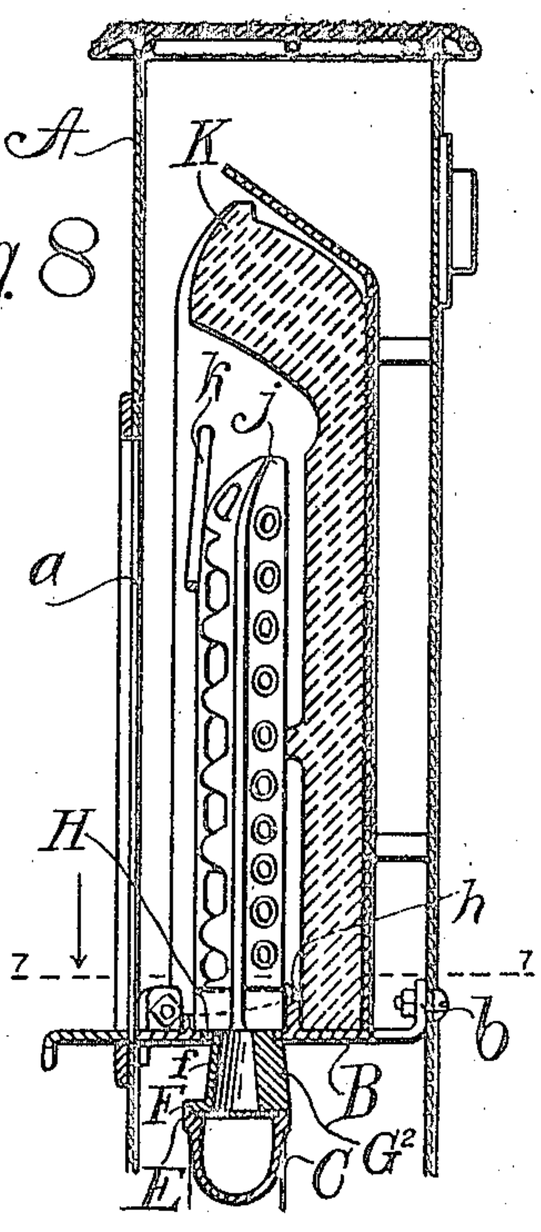
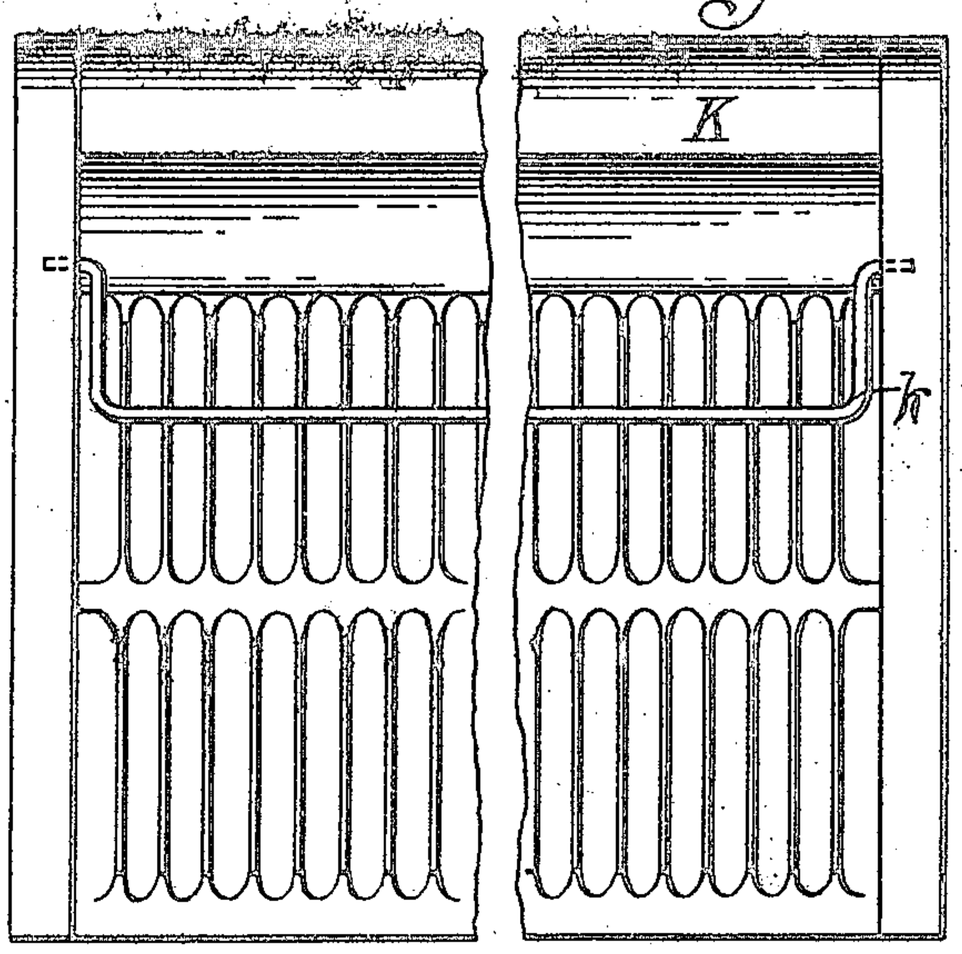


Fig. 9



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Patented Jan. 2, 1923. 1,441,051

UNITED STATES PATENT OFFICE.

JULIUS F. ADAMS, OF PITTSBURGH, PENNSYLVANIA.

GAS HEATER.

Application filed June 28, 1919. Serial No. 307,464.

To all whom it may concern:

Be it known that I, JULIUS F. ADAMS, citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gas Heaters, of which the following is a specification.

This invention relates to gas heaters, and belongs particularly with that class or type wherein openwork forms of fire-clay are arranged so that the gas flame impinges upon or envelopes them and they are rendered more or less luminous and radiant of heat.

The object of this invention is the production of a heater of the character stated, having parts of special construction and arrangement which are very durable and which may be advantageously and cheaply manufactured, and which result it is believed in unusual economy in time when assembling the parts during manufacture, and in the use of gas for heating the radiants and maintaining them in the desired heated state.

In the accompanying drawings the special construction and disposition of the parts of this invention are set forth, and Fig. 1 represents a side view of the burner, with a portion broken away to disclose the flow divider located within. Fig. 2 is a top plan view of the radiant-supporting plate or base. Fig. 3 is a cross-section of the radiant-supporting plate on the broken line 3—3 of Fig. 2. Fig. 4 is a cross-section of the plate on broken line 4—4 of Fig. 2. Fig. 5 is a cross-section of the plate on the broken line 5—5 of Fig. 2. Fig. 6 is a longitudinal section of the radiant-supporting plate on the broken line 6—6 of Fig. 2, and shows also the nozzle plate and nozzles in position with respect to the radiant-supporting plate. Fig. 7 is a plan view of one end of the radiant-support-plate full size, showing the radiants and fireback in place and in horizontal section on line 7—7 of Fig. 8. Fig. 8 is a vertical cross-section of the parts assembled. Fig. 9 is a front view of the clay fireback showing the bail for retaining the radiants.

Throughout the description and drawings the same letter is used to refer to the same part.

Considering the drawings, particularly Fig. 8, the stove casing A has the usual open front *a*, and near the bottom the casing is horizontally partitioned interiorly by the plate B that is secured to the casing by lugs and bolts such as the connection *b*.

As best shown in Fig. 1 the burned C has the intake tube D for gas and air, and it will be observed that the hollow body of the burner is largest at about the middle and decreases in size gradually towards the ends. In the largest part of the hollow interior of the burner C is located the flow divider *d*, usually formed integrally with the walls of the body of the burner and extending towards the intake tube D. The body of the burner is open at the top and has a flange E extending about it. By means of screws *e* there is secured to the flange E and closing the top of the burner, a nozzle plate F having nozzles *f* in a straight row. It is also illustrated in Fig. 1 that the flow divider *d* is situated below the nozzle plate F, and there is a space between the flow divider and the nozzle plate for the gas and air to pass freely. The flow divider splits the stream or flow of gas and air passing in by way of the intake tube D, causing the divisions of the flow to move towards the different ends of the burner.

As shown in Figs. 1, 2, 6, 7 and 8, certain of the nozzles *f* at the ends of the row of nozzles, have vertical fins or extensions such as those marked G, G^1 and G^2, and each of those extensions has a shoulder such as the shoulder *g* shown in Fig. 6, and it will be noted that the shoulder *g* engages one of the openings H, of which the plate B has a row corresponding in positions to the positions of the nozzles *f*. The purpose of the construction and the functions of the fins are three-fold. For one purpose, it is desired that the burner C shall be freely removable, and the shoulders *g* engage the openings in the plate B without wedging or binding, and the burner may be easily taken away from the plate. For a second purpose, it may be explained that certain of the shoulders *g*, as best illustrated in Fig. 7, are placed on the sides of the nozzles which lie towards the ends of the nozzle plate F. There is but one shoulder on each of the nozzles provided with them. It is believed to be clear that such arrangement of the shoulders as mentioned above prevents displacement of the nozzle plate and, consequently, the burner C lengthwise when in position and engaging the plate B. As a third purpose it may be stated that the shoulders on the extensions such as G and G^2 are placed on the sides of the nozzles towards the sides of the nozzle plate, and that

such shoulders are located on one side of one nozzle and on the opposite side of the other nozzle. Thus the burner while freely removable is, when in position, securely held against displacement lengthwise or sidewise. For the purposes of this description the plate B is termed the radiant-supporting plate, and it has erected upon it, and usually formed integrally with it, the rectangular barrier or guard *h* within which the row of openings H is located. The barrier is to limit the displacement of the radiants forward or backward. In fact the barrier or guard prevents the displacement of the lower ends of the radiants in any direction horizontally. Considering Figs. 3, 4, 5, and 7, it will be observed that the guard *h* is highest at the rear, and near the ends of the nozzle plate B the guard extends forwardly while lessening in height. Therefore, the feet of the radiants at the ends of the row of radiants cannot be displaced backwards or to the right or left, while each may be freely lifted out vertically. It will be further noted in Fig. 7, that the guard extends like a low fence in front of the feet of the radiants, which are individually separated by the V-shaped extensions J. Front or sidewise displacement of the radiants are thus prevented. By having the front wall of the guard low and the rear higher, it is easy to place the radiants in place by passing them over the front wall until the higher rear wall is encountered. The barrier has a front wall and a rear wall, the latter being relatively highest. The front wall is made less in height for convenience in placing the radiants in position. The displacement of the radiants sidewise is prevented by the V-shaped extensions J of the front wall of the barrier which project between the openings H. In Fig. 7 it will be noted that the radiants *j* are positioned by the barrier walls and the V-shaped members J directly over the openings H and burner nozzles *f* and that they cannot move to become displaced in either direction, excepting vertically when it is desired to remove them.

At the back of the radiants is the usual fireback K of refractory material, in the side walls of which is pivoted a bail *k*, which when the radiants are in place lies over them in front as set out in Fig. 8. The tops of the radiants are thus prevented from falling forward, yet the bail is easily raised when it is desired to remove or to replace the radiants.

Considering Fig. 7, it will be noted that the fins or extensions G, G′, G², project from the nozzles *f* at the end of the row of nozzles, in different directions. That is to say, the fin or extension G′ extends towards the front wall of the barrier *h*, while the fin G extends to the right and the fin G² projects towards the rear wall of the barrier. It has been explained that each extension or fin has a shoulder such, as the shoulder *g*, engaging the opening H of the plate B, and it is believed to be clear that the nozzles cannot be displaced forwardly because of the engagement of the shoulder of the extension G′ and the opening of the plate B. Similarly, the end of the row of nozzles cannot be displaced rearwardly or towards the right hand side by reason of the engagement of the shoulders of the extensions G² and G. In Figs. 1 and 2 it will be seen that there are like extensions provided for the nozzles at the other end of the row of nozzles, and displacement forward or backward or towards the left hand side is prevented by the shoulders of those extensions. It will be noted in Fig. 6 that the shoulders prevent the nozzles from passing upwardly more than a certain distance through the openings H in plate B, and that the tops of the nozzles are held concentrically in those openings leaving an annular space around each nozzle.

The operation of this invention is believed to be readily discernible from the drawings. When the burner is in place, the flame passes upwardly inside the radiants and causes them as well as the fireback to glow with intense heat and from which there is an immense amount of radiation. When cool, the radiants are easily removed by lifting the bail *k*, and there is no positive attachment whatsoever of the nozzles and the plate B, either being readily separated from the other by hand.

The construction of the burner as illustrated gives a large mixing chamber for the gas and air and an unusual saving of gas is found to result in practice.

Having now explained this invention and the mode of its operation, what I claim is:—

In a gas heater, the combination with a heater casing, of a partition plate secured horizontally within the lower portion of the casing and having a series of openings arranged in line lengthwise of the plate, a burner located below the plate and having a row of nozzles arranged in the said openings in the plate, and means for positioning the burner as the parts are assembled comprising a part of the number of nozzles near the ends of the row of nozzles provided with vertical fins, the said fins being located on different sides of different nozzles, each fin having a shoulder at the top engaging the opening in the said plate whereby when the parts are assembled the nozzles are positioned respecting the openings in said plate and displacement of the burner is prevented upwardly, or sidewise or lengthwise.

In testimony whereof I affix my signature.

JULIUS F. ADAMS.