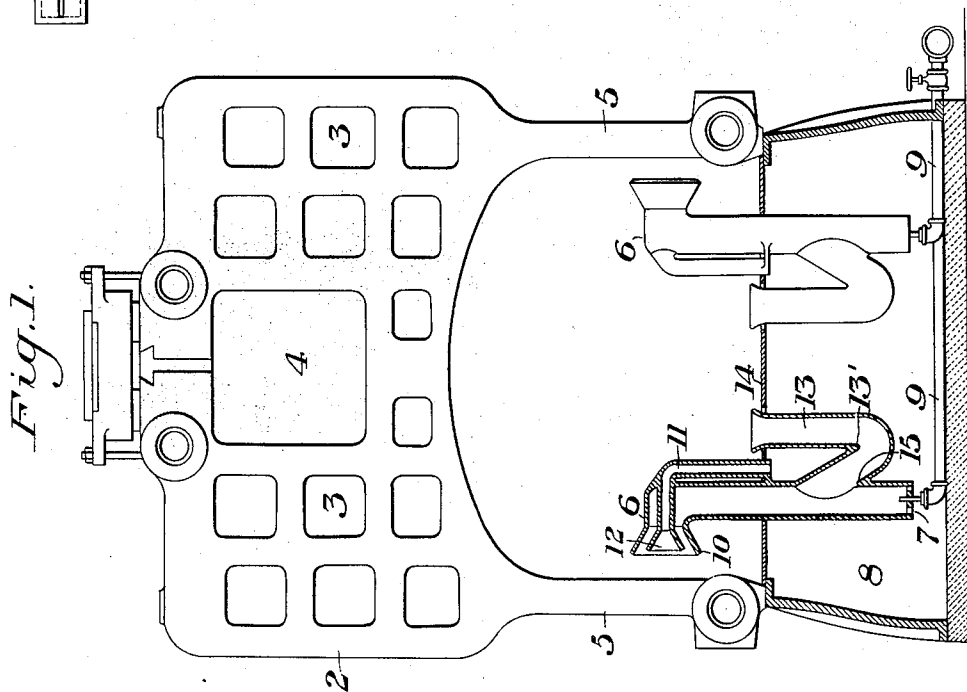
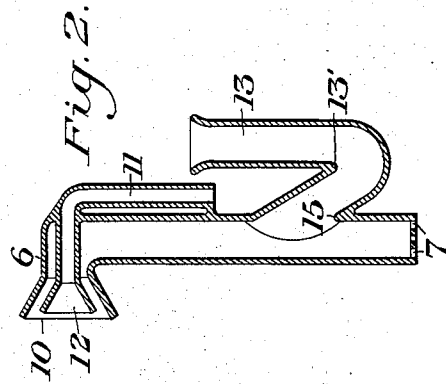
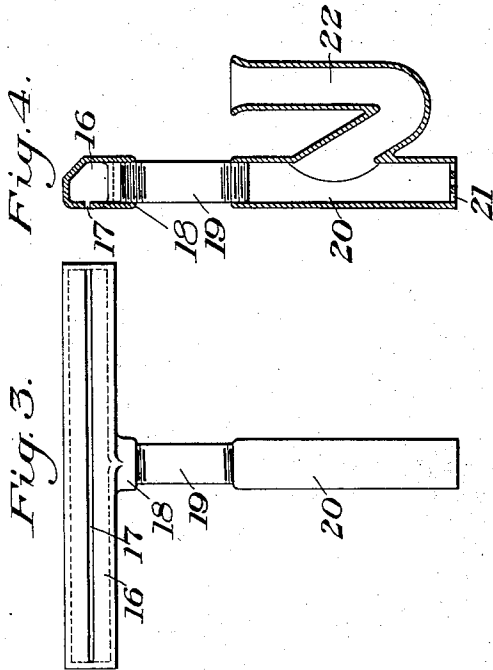


E. C. HOCK.
GAS BURNER.

APPLICATION FILED FEB. 15, 1909.

945,536.

Patented Jan. 4, 1910.



WITNESSES

R. A. Balderson
G. L. Winters

INVENTOR

E. C. Hock,
by Baker, Byrnes & Panneder,
his Attys.

UNITED STATES PATENT OFFICE.

EDWARD C. HOCK, OF PITTSBURG, PENNSYLVANIA.

GAS-BURNER.

945,536.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed February 15, 1909. Serial No. 477,918.

To all whom it may concern:

Be it known that I, EDWARD C. HOCK, of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Gas-Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention has relation to certain new and useful improvements in gas burners, and is designed to provide a burner which is adapted to secure a better admixture of the gas and air, and which can be so arranged with respect to the surfaces to be heated as to give a direct impingement of the flames against such surfaces.

A further object of the invention is to provide means whereby a large proportion of the air used for admixture with the gas can be derived from the combustion chamber of the heater instead of from the outside, thereby utilizing heated air and effecting a considerable economy in operation.

The precise nature of my invention will be best understood by reference to the accompanying drawing which will now be described, it being premised, however, that various changes may be made in the details of construction and arrangement of the parts by those skilled in the art without departing from the spirit and scope of my invention.

In the drawings: Figure 1 is a vertical section of a gas heater embodying my invention. Fig. 2 is a detail sectional view of one of the burners. Fig. 3 is a front elevation of a modified form of burner. Fig. 4 is a vertical section of the burner shown in Fig. 3.

In these drawings, the numeral 2 designates a gas heated boiler having the circulating flues 3 and 4 and the depending water legs 5. This particular form of boiler is, however, shown for purposes of illustration as my improved burners may be used for a variety of purposes.

6 designates the burners. Each burner consists of a hollow pipe or casting having inlet openings 7 at its lower end for the admission of air from the ash pit or base chamber 8 of the furnace.

9 designates the gas supply pipe having branches which enter the lower portions of the burners. The upper portion of each pipe or casting 6 is of elbow form, with a flared discharge portion 10 which is placed adjacent to the inner surface of the water leg so that the flames will be caused to impinge directly against the inner surface of such legs.

11 is an air supply pipe or tube which extends horizontally within the elbow portion of each burner and terminates in the flared discharge 12 within the flared discharge 10. This pipe or tube 11 extends outwardly through the elbow of the burner and is thence carried downwardly into the base chamber 8 within which its lower end terminates. Each burner pipe or casting is also provided within the chamber 8 with a goose-necked branch 13 which extends upwardly through the upper wall 14 of said chamber and terminates within the combustion chamber. The wall 13' in the bend of this branch 13 is preferably extended downwardly to a point somewhat below the upper edge 15 of the lower wall of the opening by which the branch communicates with the interior of the main burner pipe so as to prevent any tendency of the entering air and gas to pass into this branch.

In the operation of the burner, air and gas enter the lower end of the main burner pipe and pass upwardly and thence outwardly between the flaring ends 10 and 12, combustion taking place adjacent to the inner surface of the water leg, a further quantity of air being supplied at the point of combustion by the pipe or tube 11. The action of the burner creates a suction which will draw in heated air from the combustion chamber through the branch 13 and this heated air will further commingle with the gas and air entering the lower end of the burner pipe, causing a preheating of the mixture. The greater part of the air necessary to the operation of the burner, must be supplied through this branch from the interior of the combustion chamber, the base chamber 8 being largely closed to the atmosphere.

In the modification shown in Figs. 3 and

4, 16 designates an elongated burner head having the longitudinally extending burner slot 17 and provided with a threaded socket 18 connected by a pipe section or nipple 19 with inlet 20. This inlet 20 has the openings 21 at its lower end for the entrance of air and gas and is also provided with the goose-necked branch 22 which corresponds in form and purpose to the branch 13 of Figs. 1 and 2, this branch extending upwardly into the combustion chamber of the furnace. In this form of my invention, the auxiliary air supply pipe 11 of Figs. 1 and 2 is omitted.

The advantages of my invention result from the manner in which the burner is constructed to cause perfect admixture of the gas and air so that a high degree of combustion is obtained; and also from the arrangement of the burners whereby such combustion takes place at points adjacent to the surfaces to be heated. Also from the provision of the branch air supply pipes leading upwardly into the combustion chamber whereby the heated air in such chamber is drawn into the burners and utilized.

Various changes can be made in the details of construction and arrangement of the parts without departing from the spirit and scope of my invention. Thus the nozzle portion or head of the burner can be of any desired form as may be best suited to any particular case, and the manner of constructing and assembling the various parts may be changed. In the drawing, I have shown each burner as composed of a single integral casting, but it will be obvious that it may be built up of separate parts. In the form shown in Figs. 3 and 4, the connecting pipe sections or nipples 19 may be of any desired length and form a convenient means for connecting the head with the lower portion of the burner. If desired, however, the burner shown in these figures can be made in an integral piece.

I claim:—

1. The combination with a combustion chamber, of a gas burner having a head or nozzle portion extending into said chamber, an air and gas supply passage leading to the head or nozzle portion, and a branch passage opening into the first named passage at a point between its gas and air inlets and the head or nozzle portion and leading into the said combustion chamber, the gas passing through the first named passage acting to draw the air from the combustion chamber through the branch passage; substantially as described.

2. A gas burner having a head or nozzle portion, a combustion chamber in which the head or nozzle is located, an air and gas supply passage connected to the head or nozzle

portion, and a branch passage leading into such gas and air passage and extending upwardly to a point within the combustion chamber in which the burner is used, the branch passage having a guard wall therein extending below the lowest point of the opening through which the two passages communicate; substantially as described.

3. A gas burner consisting of a hollow pipe or casting having an elbow portion at its upper end formed with a flared discharge, a hollow deflector extending into such elbow portion and having a flared end arranged concentrically within the flared end of the elbow portion, means for admitting air through said deflector, and another air supply passage opening into the burner below the deflector and above the point of gas supply; substantially as described.

4. In a gas heater, a furnace chamber having a closed bottom wall, a burner pipe extending upwardly into said chamber through the bottom wall, means for admitting air and gas into the lower portion of the burner pipe, a hollow deflector within the upper portion of the burner pipe, and a pipe or passage connected to said deflector and extending downwardly through the closed bottom wall of the chamber; substantially as described.

5. In a gas heater, a furnace chamber having a closed bottom wall, a burner pipe extending upwardly into said chamber through the bottom wall, means for admitting air and gas into the lower portion of the burner pipe, a hollow deflector within the upper portion of the burner pipe, a pipe or passage connected to said deflector and extending downwardly through the closed bottom wall of the chamber, and an auxiliary air supply pipe leading into the burner pipe at a point above the gas inlet and extending upwardly into the furnace chamber; substantially as described.

6. In a gas heater, a furnace chamber having a closed bottom wall, a burner extending upwardly into said chamber through the bottom wall, means for admitting air and gas into the lower portion of the burner, and an auxiliary air passage leading into the burner above the point of gas entry and extending upwardly into the furnace chamber; substantially as described.

7. In a gas heater, a gas burner consisting of a hollow pipe having a laterally bent elbow at its upper end terminating in an outwardly flared or bell portion, and an inner hollow deflector within said elbow and extended outwardly through the same, and thence downwardly to a point below the elbow, and open at its lower end; substantially as described.

8. In a gas heater, a furnace chamber hav-

ing a closed bottom wall, a series of burner
pipes extending upwardly into said cham-
ber through the bottom wall, means for ad-
mitting air and gas into the lower portion
5 of the burner pipes, and hollow deflectors
within the burner portions of the burner
pipes, and pipes connected to said deflectors
and extending down through the closed bot-

tom wall of the chamber; substantially as
described.

In testimony whereof, I have hereunto set
my hand.

EDWARD C. HOCK.

Witnesses:

H. H. CORWIN,
GEO. H. PARMELEE.