

Oct. 23, 1928.

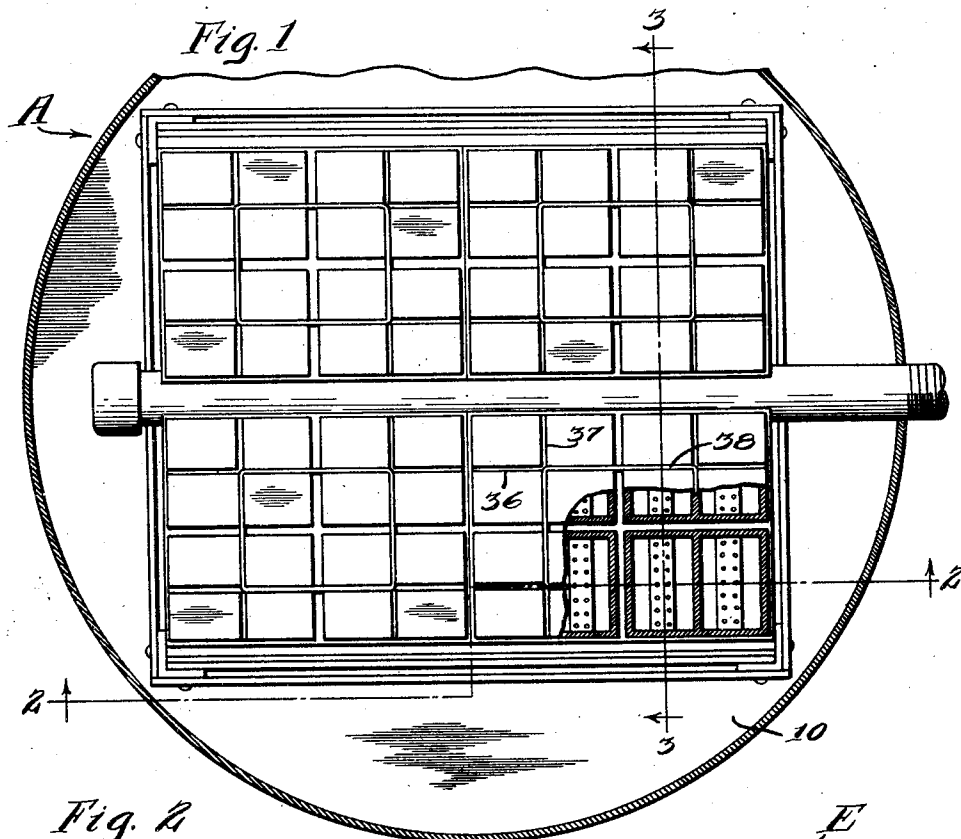
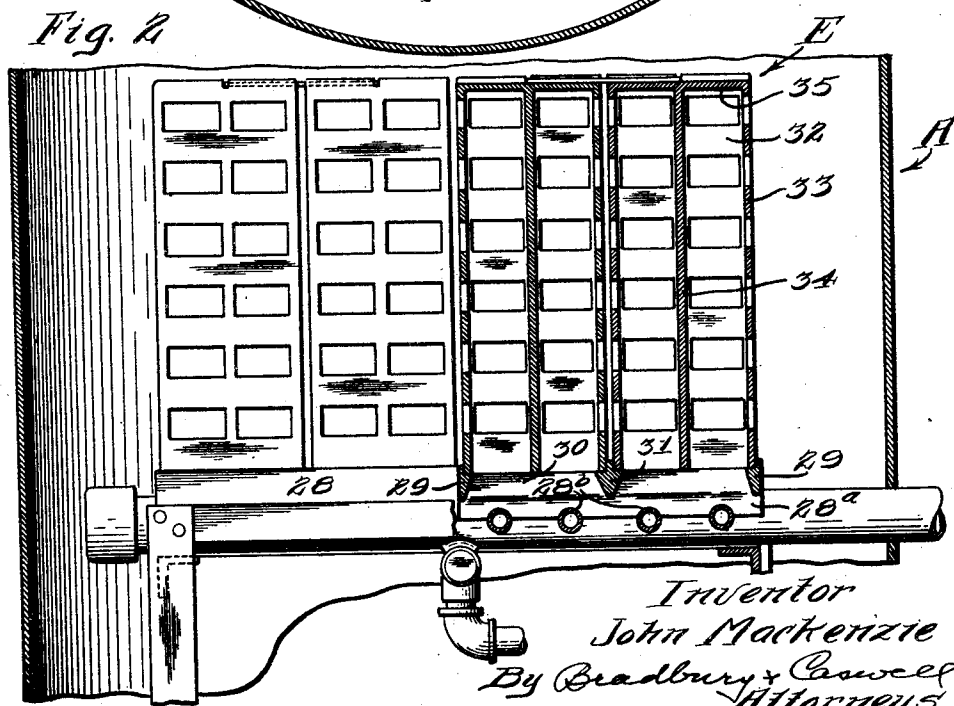
1,688,641

J. MACKENZIE

GAS BURNER

Filed May 22, 1925

2 Sheets-Sheet 1



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Fig. 3

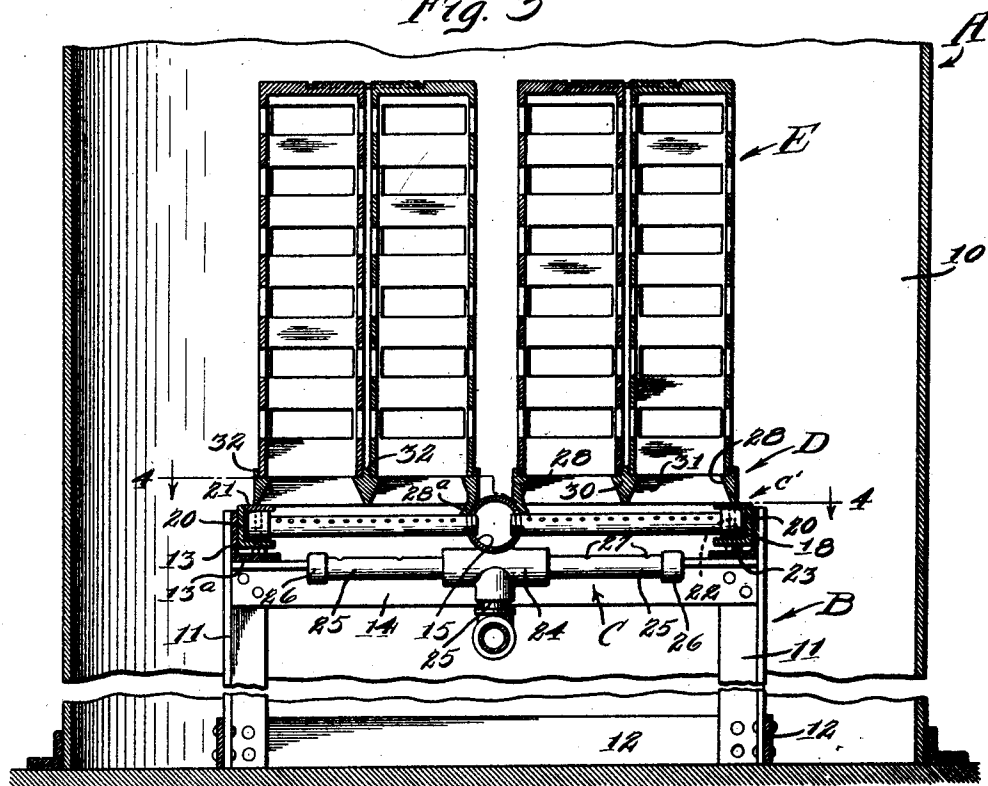
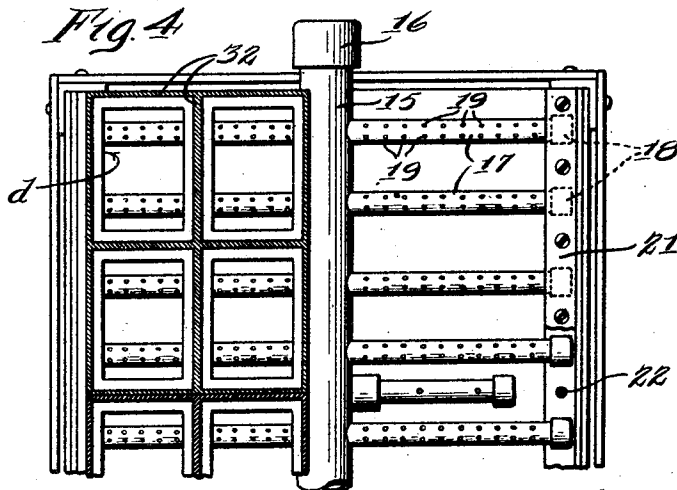


Fig. 4



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UNITED STATES PATENT OFFICE.

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GAS BURNER.

Application filed May 22, 1925. Serial No. 32,126.

My invention relates to improvements in gas burners.

An object of the invention is to provide a gas burner for furnaces and other heaters, the same being simple, inexpensive and easily repaired and adapted to promote the efficient combustion of gases.

A further object is to supply a burner of the instant nature through which the surrounding heater walls are heated by radiation, those parts of the burner providing for the radiation of heat having that relation with respect to the burner flames, whereby the maximum efficiency in the consumption of the fuel and in the radiation of heat therefrom is attained.

With the foregoing and other objects in view, which will appear in the following description, the invention resides in the novel combination and arrangement of parts and in the details of construction hereinafter described and claimed.

In the drawings, Fig. 1 is a plan view of a burner embodying my invention; Fig. 2 is a view partly in section and partly in elevation, the same being taken as on the line 2—2 of Fig. 1; Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 1 and Fig. 4 is a horizontal sectional view in detail taken as on the line 4—4 of Fig. 3.

In the drawings, wherein similar reference characters are used throughout the several views to designate similar parts, a furnace A is illustrated diagrammatically. The burner, located within the fire box 10 of the furnace, includes a stand B, a burner head C, skeleton trays D and a plurality of radiants E.

The stand B comprises four upright legs 11 of angle iron, the same being braced at their lower ends by means of side and end straps 12 and at their upper ends by means of side and end angle bars 13, 14. The side bars 13 are arranged with the flanges 13^a thereof turned inwardly of the stand to form seat members for the burner head C.

The burner head C includes a header pipe 15, which is closed by a cap 16 at one end and threaded at its other end for convenient connection with a gas supply lead. Reaching in opposite directions from the header pipe 15 are a plurality of burner members 17 in the form of nipples. The outer ends of these nipples 17 are fitted with caps 18, each of said nipples being formed with

two spaced rows of apertures 19 along its upper side to form gas orifices therefor. The burner members 17 are braced at their outer ends by means of frames c', one gripping the capped ends of the members 17 at one side of the header pipe 15 and the other similarly gripping the members 17 at the other side of said header pipe. Each frame c' includes an angle bar 20, one flange thereof underlying the caps 18 of its respective nipples 17, and also includes a strap 21 overlying said caps and complementing said flange. Bolts 22 passed between the nipples 17 and through the strap 21 and said flange of said angle bar 20 are supplied with nuts 23 for clamping said frame parts 20, 21 upon the ends of said nipples 17. Traversing the header pipe 15 and depending therefrom is a T fitting 24. Threaded into the two horizontal reaches of said fitting 24 are a pair of pilot members 25, each constituting a nipple which is fitted with a cap 26 at its outer end, each nipple being formed with gas orifices 27 in the upper side thereof. The pendent branch of the T fitting 24 receives a pilot feed pipe 25, which is suitably connected with a gas supply lead.

The stand B may rest on the bottom of a furnace devoid of grates, or may rest on the furnace grates, if desired. The burner head C is removably supported on the stand B, the application of the former to the latter being accomplished by simply seating the frames c' upon the inturned flanges or seat members 13^a of the angle bars 13.

Four skeleton trays D, molded or otherwise formed of refractory material, rest upon the burner head C. These trays are all alike and may be interchanged, thus simplifying the assemblage of the burner and minimizing the expense for replacement. Each tray D comprises side rails 28, end rails 29, a medial longitudinal rail 30 and a medial transverse rail 31. Ribs 32 on the upper faces of the rails 28, 29, 30 and 31 divide the upper side of the tray into four like sections, each comprising a narrow rectangular seat d. One side rail 28 of the tray is formed with a depending flange 28^a having notches 28^b at its lower edge to fit over the upper portions of certain of the burner members 17. Two trays D are arranged end to end at either side of the header pipe 15, the flanges 28^a of said trays bearing upon the nipples 17 adjacent to the header pipe 15

and the opposite side rails 18 resting upon the frame strap 21 of their respective frames c' . The co-operation of the notches 28^b in the flanges 28^a with the nipples 17 definitely
5 fixes the longitudinal relation of the trays D with respect to the burner head.

Standing in the seats d of the trays D are a plurality of radiants E formed of refractory material adapted to become incandescent upon being heated. These radiants are
10 identical, each comprising apertured side walls 32, apertured end walls 33, a medial transverse partition wall 34 and a cap 35. Any of the radiants E fits any of the seats
15 d of the trays C. The cap 35 of each radiant E is formed with a longitudinal slot 36 and also with a transverse slot 37 therein, said slots intersecting at the center of said cap. Portions of said slots 36, 37 in the cap
20 35 of each of the four radiants E seated in a given tray D, receive one angle of a rectangular keeper wire 38, one of such keeper wires 38 being supplied for the radiants E of each tray D to removably tie said radiants
25 together at their upper ends.

With the trays D placed upon the burner head C and properly disposed with respect to the nipples 17 by the fitting of the notches 28^b over said nipples, that relation of nipples
30 17 and radiants E, shown in Figs. 1 and 2, is attained. In such relation of said nipples 17 and radiants E, each compartment of each radiant is centered over one of the nipples 17. In forming the two rows of
35 orifices 19 in each nipple 17, they are bored so that the flames from one row will be directed against one wall of a superimposing radiant E and the flames from the other row will be directed against the partition wall
40 of such radiant.

In putting the burner into operation, the burning gas from the pilot members 25 serves to ignite the gas issuing from the burner members 17. Directed against the
45 walls of the radiants E, the flames from the burner members 17 heat said radiants E to incandescence. Thus heated, said radiants, through radiation, most effectively heat the surrounding walls of the furnace A. In
50 addition to providing for the heating of the furnace structure mainly by radiation, the radiants E, due to their disposition with respect to the burner members 17, insure combustion of the fuel in the highest degree.

Changes in the specific form of my invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a burner, an elongated header member, co-planer sets of equally spaced burner members branching off from either side of
55 said header member, each burner having two

rows of divergently related orifices extending longitudinally thereof, frames joining the outer ends of each of the opposing sets of burner members, a stand including seats for said frames, skeleton trays removably
70 mounted on said burner members and located in given relation transversely thereof by co-operation therewith, said trays being formed with seats, radiants removably mounted in the seats of each tray and disposed thereby
75 in respect to the burner members, whereby opposed walls of each radiant are respectively stationed in the line of flames issuing from the divergent orifices of one of the burner members, and keeper members, each
80 common to the radiants in a given tray, each keeper member being adapted releasably to tie together its respective radiants.

2. In a burner, a header member, burner members branching off from said header
85 member, each burner having two rows of divergently related orifices extending longitudinally thereof, skeleton trays removably mounted on said burner members and located in given relation transversely thereof by co-
90 operation therewith, said trays being formed with seats, radiants removably mounted in the seats of each tray and disposed thereby in respect to the burner members, whereby opposed walls of each radiant are respectively
95 subjected to the flames issuing from the diverging orifices of one of the burner members.

3. In a burner, a burner member having two rows of divergently related orifices extending longitudinally thereof, a support located in given relation transversely of said burner member, and radiants having upright compartments, said radiants being open at the lower ends thereof and carried by said
105 support and disposed thereby so that each radiant compartment is centered over the burner member, whereby opposite inner walls of each radiant compartment are subjected to flames issuing from the diverging orifices
110 of said burner member.

4. In a burner, a header member, burner members branching off from said header member and formed with series of orifices longitudinally thereof, a support removably
115 seated on said burner members and formed with seats therein, said support co-operating with said burner members, whereby its relation with respect to said members is definitely fixed, and hollow radiants held in the seats
120 of said supports, the arrangement of said support with respect to the burner members providing for the subjection of a certain inner wall of each radiant to burner flames issuing from a certain series of orifices.
125

5. In a burner, an elongated header member, co-planer sets of equally spaced parallel burner members branching off from either side of said header member, frames joining the outer ends of each of the opposing sets of
130

burner members and a stand adapted to receive said frames to support the burner members at the outer extremities thereof.

5 6. In combination, burner members, a plurality of mountings associated with said members, a group of companion radiants removably supported by each mounting, keepers, one for each group of radiants, each
10 keeper being carried solely by its respective radiants and serving to tie one to another thereof.

7. A burner including a mounting for a number of radiants, a group of radiants removably supported by said mounting, each
15 radiant being formed with keeper engaging means thereon, and a keeper co-operating with the keeper engaging means of said radiants and serving to tie each radiant of the group to the other radiants thereof.

20 8. In a burner, a header member, burner members branching off from said header member, supports removably mounted on said burner members in given relation only transversely thereof, hollow radiants applicable only in given relation to and carried
25 by said supports and disposed thereby in respect to the burner members, whereby certain inner walls of each radiant are subjected to flames issuing from certain burner members.
30

9. In a burner, a header member, a series of burners branching off from said header member, supports superimposing said burner members, said supports having a plurality of
35 seats adapted to receive and carry a number of radiants in banked formation, said seats preventing lateral movement of said radiants at the lower portions thereof, and keepers attached to the upper portions of said radiants and carried solely thereby for holding
40 the same from lateral movement in any direction.

10. In a burner, a header member, a series of burners branching off from said header member, supports superimposing said burner
45 members, said supports having a plurality of seats adapted to receive and carry a number of radiants in banked formation, the seats of each bank being disposed in encircling relation and serving to hold the
50 lower ends of said radiants from lateral movement, an encircling keeper encircling all of the radiants in a bank, and means on said radiants engaging said keeper for holding said radiants from lateral movement at
55 the upper portions thereof.

In testimony whereof, I have signed my name to this specification.

JOHN MACKENZIE.