Jan. 20, 1942. G. A. GUENTHER 2,270,798

HEATING APPARATUS

Filed Aug. 4, 1939

Fig. 1.

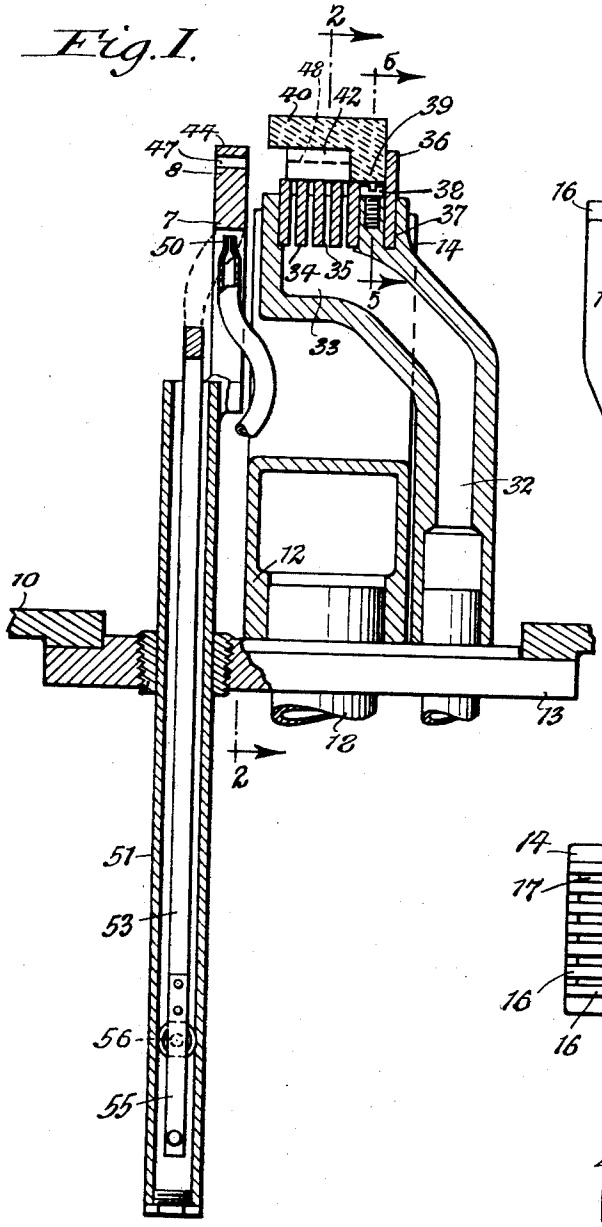


Fig. 2.

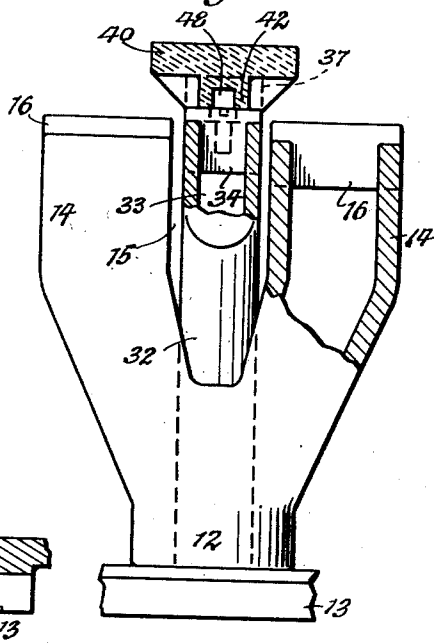


Fig. 3

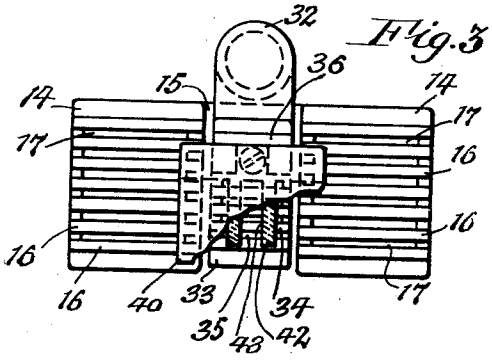


Fig. 4

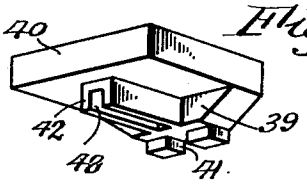
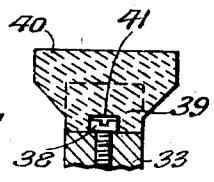


Fig. 5



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Patented Jan. 20, 1942

2,270,798

UNITED STATES PATENT OFFICE

2,270,798

HEATING APPARATUS

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Application August 4, 1939, Serial No. 288,404

2 Claims. (Cl. 158—115)

This invention relates to a heating apparatus in which gas is burned within a combustion chamber connected with an exhausting device so that the products of combustion are constantly withdrawn therefrom and in which the gas is supplied through a thermostatically controlled valve mechanism of the electrical type such, for example, as that shown in the United States Patent No. 2,134,083 to which reference may be had for a detail description of such parts as may be only generally referred to in the following description.

In the heating apparatus of this type as heretofore constructed the gas from the main burner was not always ignited promptly by the pilot burner so that considerable gas was liable to accumulate in the combustion chamber before ignition occurred and this resulted in undue noise and shock and also was liable to extinguish the main and pilot burner when the mass of gas burned too violently upon being ignited.

One of the objects of this invention is to provide deflecting means whereby the flame of burning gas of the pilot burner is directed toward the gas outlet of the main burner so as to positively ignite the same, also prevent any flash upon such ignition from extinguishing the flame.

Another object of this invention is to so construct the gas deflecting means associated with the main and pilot burners that the same can be readily removed from the burners and reapplied thereto for convenience in cleaning the burners and the deflecting means.

In the accompanying drawing:

Fig. 1 is a vertical section, taken on line 1—1, Fig. 2.

Fig. 2 is a vertical section taken on the correspondingly numbered line in Fig. 1.

Fig. 3 is a top plan view, partly broken away, of the main and pilot burners.

Fig. 4 is a perspective view of the means whereby gas is deflected from the pilot burner toward the main burner.

Fig. 5 is a fragmentary vertical section of the pilot burner taken on line 5—5, Fig. 1.

In the following description similar characters of reference indicate like parts in the several figures of the drawing.

Referring to Fig. 1, the numeral 10 represents the bottom of the combustion chamber of the heating apparatus from which the products of combustion and gases are withdrawn by any suitable means such, for example, as the exhaust pump or fan shown in the patent above mentioned.

Within the lower part of the combustion chamber is arranged a main gas burner whereby the heat is produced which burner, as shown for example in Figs. 1, 2, and 3, may comprise a lower upright tubular inlet neck 12 mounted on a supporting plate 13 which closes an opening in the bottom of the combustion chamber and two hollow branches or heads 14 projecting upwardly from said neck and separated from each other by an intervening gap or space 15. Each of these main burner heads or branches is provided in its upper end with a grid which is formed by a plurality of upright grid plates 16 which are arranged lengthwise and parallel and spaced apart to provide a plurality of narrow slits 17 between them which constitute the gas outlet of the main burner.

Gas and air may be supplied to the main burner in any suitable manner but this is preferably effected by substantially the same means shown in the patent previously referred to, which means include a combustible gas and air mixture inlet pipe or conduit 18 connected with the lower end of the neck of the main burner.

Within the gap or space between the two branches or heads of the main burner is arranged the pilot burner the gas from which is constantly lighted and utilized for relighting the gas from the main burner whenever the flow of the same after its interruption has been restored. In its preferred construction this pilot burner comprises a lower upright tubular inlet neck 32 which is mounted on the plate 13 on one side of the neck of the main burner, and an upper hollow head 33 arranged between the hollow heads of the main burner. The upper end of the pilot burner head is provided with a grid consisting of a plurality of upright grid plates 34 which are arranged lengthwise and parallel and spaced apart to form a plurality of upright gas outlet slits 17 between them through which the gas issues from the pilot burner.

The means which embody this invention for deflecting the gas from the outlet of the pilot burner toward the outlet of each head of the main burner and preventing the latter from being extinguished and also permitting ready cleaning of the burners are preferably constructed as follows:

The numeral 36 represents an abutment wall mounted lengthwise on top of the head of the pilot burner adjacent to one side thereof and preferably secured to the same by providing this head with a longitudinal groove 37 in which the lower edge of this wall is secured by a driving

fit. Adjacent to the inner side of this wall the top of the pilot burner head is provided with an upward centering or retaining projection **38** which preferably has the form of a screw, as shown in Figs. 1 and 2.

The numeral **39** represents the base of a gas deflector which engages its outer side with the inner side of the wall **36** and rests on the adjacent part of the pilot burner top and the grid plate on the respective longitudinal side of this burner. On its underside this base is provided with a notch **41** which receives said centering projection **38**, thereby holding the deflector against longitudinal movement on the pilot burner. The numeral **40** represents a horizontal deflecting plate having its central part arranged over the outlet slits of the pilot burner while its opposite transverse edge portions overhang the adjacent gas outlet slits of the main burner heads on opposite sides of the pilot burner. This deflecting plate is connected only at one of its longitudinal edges with the top of said base and projects transversely therefrom to the opposite side of the pilot burner but is free and not connected with the latter. On the underside of the deflecting plate and the inner side of the base is arranged a transverse partition or rib **42** which rests crosswise on only the central parts of the grid plates of the pilot burner leaving opposite ends of the slits between the plates uncovered. This base, deflecting plate and partition are preferably made integrally of refractory material so as to withstand the heat of the burning gas of the main and pilot burners to which the same are subjected while in use.

Raw gas only is supplied to the pilot burner by a pipe **43** which has its inlet end connected with the main gas supply while its outlet end is connected with the lower end of the neck of the pilot burner.

From the foregoing description of the gas deflector it will be clear that in its general conformation the same is T-shaped in longitudinal section and L-shaped in cross section. When mounted on the top of the pilot burner two angular passages are formed between the top of the pilot burner and the adjacent top parts of the two branches or sections of the main burner each of which passages extends upwardly from the pilot burner on one side of the partition of the deflector and horizontally and lengthwise over one of the main burner heads and horizontally laterally in a direction opposite to the base of the deflector. It follows from this construction of the deflector that the gas issuing lengthwise from the pilot burner in the form of a flame will light the gas issuing from both heads of the main burner and some of the gas issuing from the pilot burner will also be directed laterally and burn in a flame against a safety thermostatic switch which is arranged adjacent to that side of the deflector opposite to its base and which forms part of the safety means for shutting off the supply of gas to the main and pilot burners in the event that the flame is extinguished, thereby avoiding flooding of the room with raw gas and possible damage.

By thus forming two longitudinal gas passages between the underside of the deflector and the pilot and main burner sections which are separated by the partition it will be difficult, if not impossible, for both branches of the burning stream of gas issuing from the pilot burner and from both heads of the main burner to be extinguished at the same time because the deflector will act as a baffle whereby a flash, puff or blast of the gas in one direction will possibly blow out the flame of one main burner head and one part of the flame issuing from the pilot burner but leave the flame of the other main burner head and the respective part of the pilot flame unaffected so that the flame retained operates automatically to relight the extinguished burner head and the adjacent part of the pilot burner when the effects of the flash, puff or blast has been spent. Due to this functioning of the deflector the possibility of the burners being extinguished accidentally is virtually rendered impossible, thereby avoiding damage and injury which otherwise might occur.

By arranging the deflector over the pilot burner the gas outlet passages of the latter are protected against the possibility of becoming clogged by soot falling thereon from above, thereby maintaining the pilot burner clean and in good serviceable condition and materially reducing the amount of attention usually required for keeping the burners in the best operative condition.

During the normal operation of the heating apparatus when all the burners are lighted the raw gas which issues from the pilot burner is added to and burns with the gaseous mixture of raw gas and air which issues from the heads of the main burner. But when the flame of the main burner is extinguished by the shutting of the supply of gas thereto then the heads of the main burner only discharge air at their outlets and this mixes with the raw gas issuing from the pilot burner so as to produce a combustible mixture which burns in a flame ready to reignite the gaseous mixture which issues from the main burner heads when the supply of gas is again restored.

The thermostatic safety means adapted to quickly cut off the supply of gas to the main burner in the event that the pilot burner fails to ignite the same do not form part of this application but those parts shown in the drawing are constructed as follows:

Within the combustion chamber and adjacent to that side of the pilot burner opposite to the base of the gas deflector is arranged the metal body **7** of a thermostat having parts which are movable relatively in response to changes in temperature and which are adapted to open and close an electric switch which is arranged in a circuit containing a room thermostat and the coil of a solenoid magnet which actuates a gas controlling valve, as set forth in said patent. This thermostatic body is arranged lengthwise along the gas deflector and the pilot burner and adjacent parts of the main burner heads, and horizontally opposite the laterally opening ends of the gas passages between the top of the pilot burner and the gas deflector thereon, whereby the flames issuing from these passages and the adjacent parts of the main burner heads upon striking the upper part of the body **7** will cause the same to expand relative to its inner or lower part which is below the path of the flame from the burners, thereby causing the legs **51**, **53** connected with opposite ends of the thermostatic body to move toward each other but when said flames are extinguished and the upper part of this body cools off then the latter will contract and cause the legs of this body to separate or move away from one another.

The relative movements of the legs **51**, **53** of the thermostat body are utilized to close and open a switch in the circuit of the solenoid mag-

net which switch in this case includes a stationary contact **56** arranged on the leg **51** and a movable contact **55** on the leg **53**.

These two switch contacts **56**, **55** are included in series in the electric circuit containing the solenoid magnet coil above referred to and when the gas burners are operating normally the flame from the pilot burner and the adjacent part of the main burner, if the latter is lighted, will heat the thermostat body and expand the same so that the movable leg **53** thereof will be turned toward the stationary leg **51** whereby its switch contact **55** will be engaged wtih the stationary contact and close the circuit of the solenoid magnet and cause the gas control valve to be opened. These parts will remain in this condition so long as a gas flame issues from the pilot burner and heats the thermostat body. If, however, the pilot light goes out while the gas control valve is closed the cooling of the thermostat body will cause its movable leg **53** to move away from the companion stationary leg **51** and disengage the movable switch contact **55** from the stationary contact **56**. As a result the electric circuit of the solenoid magnet will be broken and the control valve will remain closed, thereby preventing flow of gas to the main burner. Cooling of the thermostat body is aided by a stream of air delivered against the same by a nozzle **50**.

I claim as my invention:

1. A heating apparatus comprising, a pilot burner having a gas outlet, and a deflector having a plate arranged with its central part over said pilot burner and projecting with its opposite edges over the opposite ends of said pilot burner and the underside of said plate being provided between its end edges with a partition which directs the gas issuing from the pilot burner in opposite directions therefrom over the ends of the pilot burner and said plate being also provided on its underside at right angles to said partition with a base which rests on the pilot burner.

2. A heating apparatus comprising, a pilot burner having a gas outlet, a longitudinal wall arranged on top of the pilot burner on one side of its gas outlet, an upward projection arranged on top of said pilot burner adjacent to the inner side of the central part of said wall, and a deflector comprising a longitudinal base resting on top of said pilot burner and engaging with the inner side of said wall and provided with a notch which receives said projection, a horizontal plate extending from the top of said base over the outlet of said pilot burner in a direction opposite to said wall, and a transverse partition arranged on the underside of said plate between the transverse edges of the same and the opposite ends of the burner.

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