Oct. 1, 1963 A. B. CHAMBERLAIN 3,105,432

VENTING AND AIR INTAKE SYSTEM FOR HEATERS

Filed May 15, 1959 2 Sheets-Sheet 1

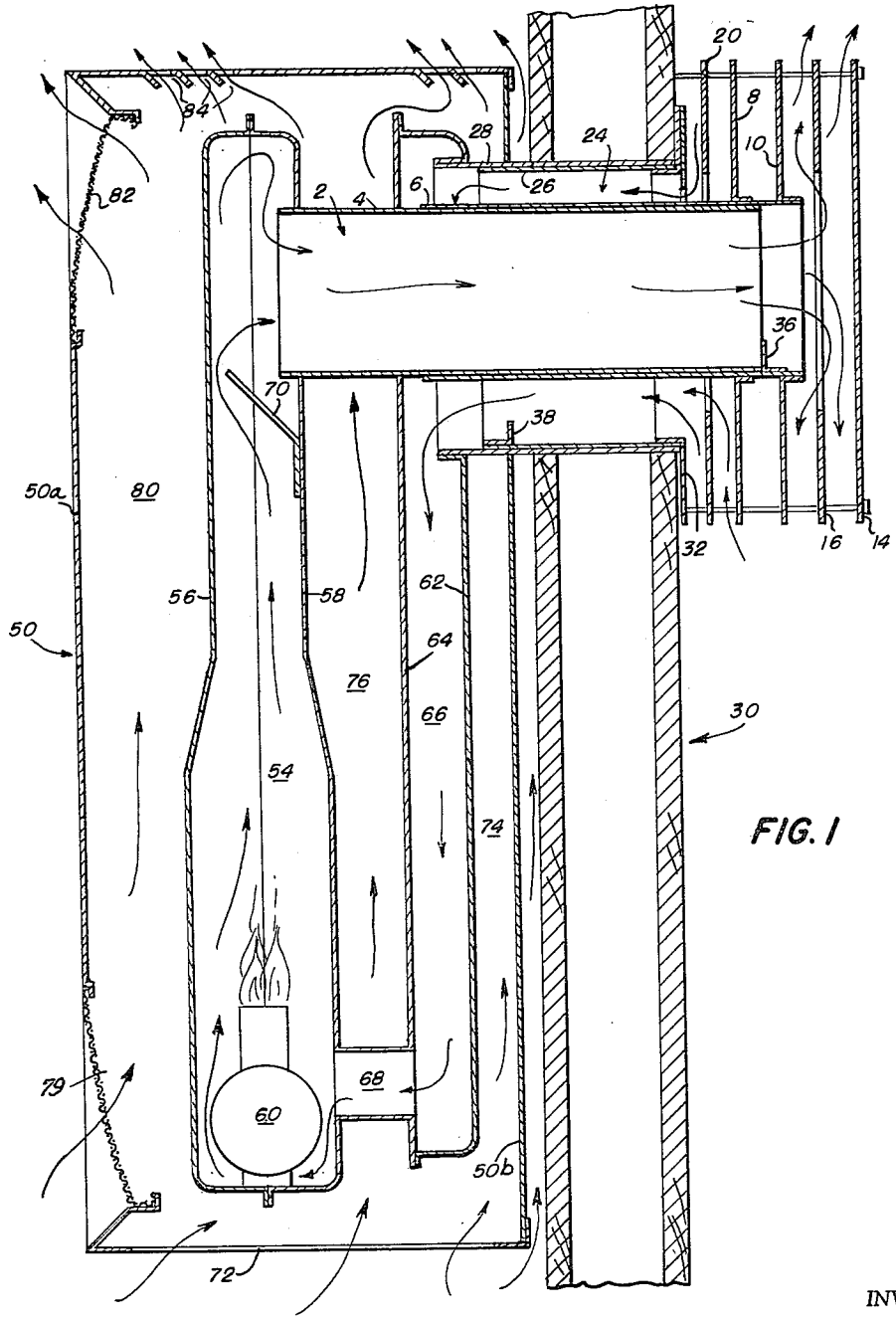


FIG. 1

INVENTOR

ALBERT B. CHAMBERLAIN

BY Fisher, Christen & Goodson

ATTORNEYS

Oct. 1, 1963 A. B. CHAMBERLAIN 3,105,432

VENTING AND AIR INTAKE SYSTEM FOR HEATERS

Filed May 15, 1959 2 Sheets-Sheet 2

FIG. 2

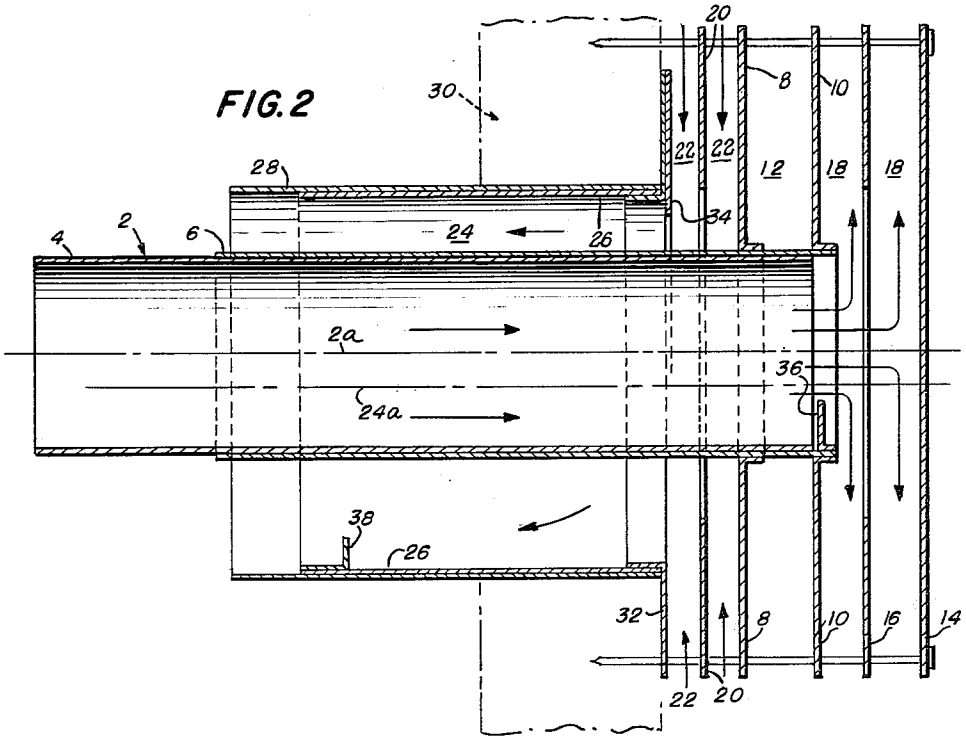
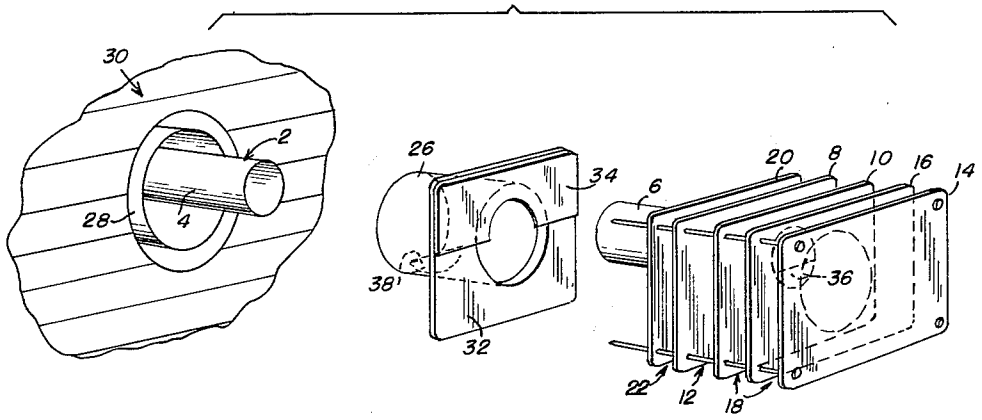


FIG. 3



INVENTOR

ALBERT B. CHAMBERLAIN

BY Fisher Christen & Goodson

ATTORNEYS

United States Patent Office 3,105,432 Patented Oct. 1, 1963

3,105,432

VENTING AND AIR INTAKE SYSTEM FOR HEATERS

Albert B. Chamberlain, Chattanooga, Tenn., assignor to Chattanooga Royal Company, Chattanooga, Tenn., a corporation of Tennessee

Filed May 15, 1959, Ser. No. 813,458
9 Claims. (Cl. 98—62)

This invention is a combined exhaust vent or outlet for combustion gases from a heater, and an air intake or inlet for delivering air to be heated, and for combustion, to the heater. The heater is preferably of the type for household use.

The combined outlet-inlet structure is mounted in and passes through the wall or roof of a building, to the outside air, and is connected to a heater, preferably gas or oil fired, on the inside of the building.

The principal objects of the invenion are to provide an outlet-inlet structure which provides efficient delivery of combustion gases to the outside, and efficient intake of outside air, but with a minimum of admixture of the outgoing gases and incoming cool air. The structure is adjustable for use with walls of varying thickness. Dams are provided for preventing ingress of rain, snow or condensed moisture.

More specifically, the combined inlet-outlet structure comprises an exit or flue pipe for combustion gases, positioned horizontally when used in a vertical wall; it would be positioned vertically, if passing through a roof; it will be described herein as positioned horizontally; the inner end of this pipe is connected to the heater inside the building, its outer end extending well beyond the building wall and is provided with a plurality of baffles extending transversely of the pipe. A pair of these baffles is positioned near the end of the flue pipe, these baffles being substantially parallel and in a vertical plane and spaced apart laterally defining between them a dead air zone. Additional similarly positioned baffles are positioned inwardly of said dead air zone for defining inlets for cool outside air, and additoinal similarly positioned baffles are positioned outwardly of said dead air zone for defining exits for combustion gases, the intermediate dead air zone minimizing admixture of the incoming air and outgoing combustion gases.

Surrounding the described exit pipe is a larger air inlet pipe, the exhaust pipe being non-coaxial therewith, with the horizontal center line of the exit pipe being above the horizontal center line of the air intake pipe.

The inlet and outlet pipes are preferably provided with horizontal transverse dams for preventing the ingress of rain, snow or condensed moisture, which would tend to rust the pipes.

The inlet and exhaust pipes are preferably both composed of telescoping parts, thereby making them laterally adjustable for walls or roofs of different thicknesses.

The invention as described and the heater with which it is used, will be described in more detail in the accompanying drawings wherein:

FIG. 1 is a vertical sectional view of the thru-the-wall heater of the present invention.

FIG. 2 is an enlarged vertical section of the exit-inlet pipes for exahust gas and incoming air.

FIG. 3 is an exploded perspective view of the parts as on the outside of a wall.

Referring now to these drawings, the flue or exit pipe, indicated generally at 2, comprises an inner pipe 4 and an outer pipe 6 telescoped therewith. Positioned transversely on this exit pipe 6 is a pair of transverse baffles 8 and 10, spaced apart laterally, defining between them an air zone 12, open to the outside air.

Positioned further outwardly of the exit pipe 2, beyond air zone 12 is an outer closed baffle 14 and an inner centrally open baffle 16, defining between them outlet passages 18 for exhaust gas.

Positioned inwardly of air zone 12 is a vertical transverse centrally open baffle 20, defining air inlet passages 22 for outside air.

Baffles 8, 10, 14, 16 and 20 are preferably flat and square shapes which have proved efficient and desirable.

Surrounding the exit passage 2 is an air inlet pipe indicated generally at 24, composed of telescoping pipe sections 26 and 28. Pipes 26 and 28 are mounted in wall 30, an angled facing plate 32 engaging with the wall and with pipe 24. Facing plate 32 serves to position a drip shield 34.

The outlet pipe 2 is provided, across the bottom thereof, with one or more transverse dams or partitions 36, and the air inlet pipe 24 is provided with one or more similar transverse dams or partition 38, for preventing ingress of rain or condensed moisture which would tend to rust the parts.

Exit passage 2 is non-coaxial with inlet pipe 24, the center line 2*a* of the outlet pipe being above the center line 24*a* of the inlet pipe; by virtue of this arrangement, the inlet passages at the lower part of baffle 20 are made larger, for entry of most of the cool air; most of the hot exhaust gases escape through the upper passages 18, well removed from the incoming cool air, which arrangement, in cooperation with the air zone 12 tends to separate the incoming air and outgoing flue gas, making for more efficient combustion.

Cooperating with the parts just described is a heater, indicated generally at 50, having front and back walls 50*a* and 50*b*. Within the heater is a combustion chamber 54 having front and back walls 56 and 58. In the bottom of 54 is an oil or gas burner 60. Vertical partition walls 62 and 64 define between them a passage 66 for incoming cool air, passage 66 being connected to the inner end of air passage 24 and air pipe 28. This incoming air passes thru passage 68 to the burner 60. Combustion gas passes up chamber 54, past baffle 70 and into exit pipe 2.

Cool room air to be heated enters the bottom of casing 50 thru opening 72, some passing up passage 74 between walls 50*b* and 62. This body of cool air keeps the back wall 50*b* cool, back wall 50*b* also being spaced from wall 30 to define an insulating air space, all for minimizing danger of fire from overheating of the back of the heater.

More cool air passes up vertical passage 76 between wall 64 and hot wall 58 and out of the top of the heater. Additional cool air, entering at the bottom of the heater at 79, passes up vertical passage 80, past hot wall 56 and out of the top of the heater at 82 and 84.

To summarize the operation: Hot combustion gases from combustion chamber 54 pass out exhaust pipe 2 and out passages 18; incoming cool air enters passages 22, most of its coming in below pipe 2, while most of the exhaust gases leave well above pipe 2, at a higher level, thereby minimizing admixture of the outgoing gases and incoming air, a feature also substantially aided by the spacing between the gas and air provided by the air zone 12. The incoming air feeds the burner 60, while cool room air is heated from the hot walls 56 and 58 of the combustion chamber. The back wall of the heater is kept cool by cool air in 74 and such back wall is spaced from wall 30 to prevent overheating of wall 30.

While the preferred embodiment of the invention has been described in some detail, it should be understood that the invention may be carried out in other ways, as falling within the scope of the following claims.

I claim as my invention:

1. In flue means for combustion devices, the combination including, an exit pipe for combustion products, an

air inlet pipe surrounding and radially spaced from said exit pipe, said exit pipe terminating axially beyond said inlet pipe, said inlet pipe terminating in a radially outwardly directed plate member, said exit pipe being provided with a first radially outwardly directed baffle member spaced axially beyond said plate member and defining with said plate member an air inlet zone, a second radially outwardly directed baffle member positioned on the exterior of the exit pipe spaced axially beyond said first-mentioned baffle member and defining with said first-mentioned baffle member an air zone open only to the outside air, and a third baffle member positioned axially beyond the termination of said exit pipe and parallel with said second baffle member and defining with said second baffle member an exhaust outlet zone.

2. The combination of claim 1, wherein both of said pipes are horizontal and wherein the horizontal axis of the exit pipe is above the horizontal axis of the air inlet pipe, for thereby providing a larger zone for incoming cool air below the exit pipe and thereby minimizing admixture of cool air with the outgoing gases from the exit pipe.

3. The combination of claim 1, wherein both of said pipes are horizontal and wherein the horizontal axis of the exit pipe is above the horizontal axis of the inlet pipe, further including a vertically positioned drip shield extending radially inwardly into the upper portion of the air inlet pipe adjacent the termination thereof.

4. The combination of claim 1, wherein said exit pipe comprises two telescoping parts for varying the effective length thereof for use in walls of different thicknesses, and for varying the positioning of the baffles carried by the exit pipe.

5. The combination of claim 1, wherein said baffles are square.

6. The combination of claim 1, wherein both said pipes are disposed along horizontal axes and said exit pipe is provided with a transverse dam across the lower portion thereof at its point of termination for preventing the ingress of rain water and moisture.

7. The invention as defined in claim 1, wherein a fourth radially directed baffle member is positioned medially spaced between said plate member and said first baffle member, and a fifth radially directed baffle member is positioned medially spaced between said second and third baffle members, said fourth and fifth baffle members having an opening in their respective central portions.

8. The invention as defined in claim 7, wherein both said pipes are disposed along horizontal axes, said inlet pipe being provided with a radially inwardly directed drip shield extending over a portion of the upper periphery of the inlet end and also being provided with a radially upwardly projecting dam across the lower portion spaced axially from the inlet end.

9. In flue means for combustion devices, the combination including, an exit pipe for combustion products, an air inlet pipe surrounding and radially spaced around its entire inner periphery from said exit pipe, said exit pipe terminating axially beyond said inlet pipe, outlet chamber means for said exit pipe having at least one wall and having a peripheral radially directed outlet opening, said outlet opening having radial dimensions substantially greater than the diameter of the exit pipe, inlet chamber means for said inlet pipe having at least one wall and having a peripheral radially directed inlet opening, said inlet opening having radial dimensions substantially larger than the diameter of the inlet pipe, one wall of said outlet chamber means comprising a baffle plate disposed inwardly in airtight engagement with and projecting radially outwardly from the entire periphery of said exit pipe, one wall of said inlet chamber means comprising a second baffle plate disposed inwardly in airtight engagement with and projecting radially outwardly from the entire periphery of said exit pipe and spaced axially from said first baffle plate to provide a zone of insulating atmospheric air between said outlet and inlet chamber means.

References Cited in the file of this patent

UNITED STATES PATENTS

217,712	Smith	July 22, 1879
1,789,560	Moore	Jan. 20, 1931
2,468,234	Ratcliff	Apr. 26, 1949
2,632,435	Lundstrum	Mar. 24, 1953
2,713,301	McKann	July 19, 1955
2,755,794	Wendell	July 24, 1956
2,854,914	Galbraith	Oct. 7, 1958
2,856,837	Thulman	Oct. 21, 1958
2,964,034	Nordholt et al.	Dec. 31, 1960

FOREIGN PATENTS

557,259	Belgium	May 31, 1957
611,498	Great Britain	Oct. 29, 1948
771,986	Great Britain	Apr. 10, 1957
822,956	Great Britain	Nov. 4, 1959
859,308	Great Britain	Jan. 18, 1961

OTHER REFERENCES

German application, H 15441, Oct. 13, 1955.