COMBUSTION CHAMBER FOR DRYER

Inventor: L. Dean Kuhn, Newton, Iowa
Assignee: The Maytag Company, Newton, Iowa
Filed: July 26, 1973
Appl. No.: 382,866

Primary Examiner—John J. Camby
Assistant Examiner—Henry C. Yuen
Attorney, Agent, or Firm—William G. Landwier, Richard L. Ward

ABSTRACT

A clothes dryer includes a fuel combustion chamber comprising a pair of telescopically housing portions defining a generally annular secondary air intake intermediate the opposite ends of the combustion chamber formed by the housing portions. The annular secondary air intake formed by the telescoped housing portions permits more complete combustion of the fuel while achieving a decreased surface temperature of the combustion chamber wall.

7 Claims, 3 Drawing Figures
1. Field of the Invention
This invention relates to heating apparatus and more particularly to a novel fuel combustion chamber for a clothes dryer.

2. Description of the Prior Art
Prior art shows a continuing search for improved fuel combustion apparatus to achieve the utmost efficiency in combustion and heating. U.S. Pat. No. 2,606,014 for example discloses a space heater in which the combustion chamber comprises a conical housing having spaced perforations near the enlarged egress end for admitting secondary combustion air under the influence of a driven fan. U.S. Pat. No. 2,852,241 on the other hand discloses a double wall combustion chamber including a square collar at the reduced end of a generally conical combustion chamber for admitting secondary air into the fluid system. Still further U.S. Pat. No. 3,291,467 shows an elongated conical combustion chamber including spaced perforations near the reduced end of the conical housing for admitting secondary air and being sloped upwardly relatively to the fuel burner.

SUMMARY OF THE INVENTION
It is an object of the instant invention to provide a fuel combustion chamber for achieving improved airflow to effect more complete combustion and greater heating efficiency.

It is a further object of the instant invention to provide a combustion chamber comprising a pair of telescoped housing portions defining a generally annular secondary air intake intermediate the opposite ends of the combustion chamber.

It is a still further object of the instant invention to provide a fuel burner combustion chamber having a pair of telescoping housing portions connected by integral legs formed in one of the housings to define a generally annular secondary air intake intermediate the ends of the combustion chamber for achieving more complete combustion and greater heating efficiency.

The instant invention achieves these objects in a clothes dryer having a combustion chamber comprising a pair of housing portions having an intermediate connecting relationship defining a generally annular secondary air intake intermediate the ends of the combustion chamber.

Operation of the device and further objects and advantages thereof will become evident as the description proceeds and from an examination of the accompanying two pages of drawings.

BRIEF DESCRIPTION OF THE DRAWINGS
The drawings illustrate a preferred embodiment of the invention with similar numerals referring to similar parts throughout the several views wherein:

FIG. 1 shows an overall view of a clothes drying apparatus partially broken away and sectioned to show a preferred embodiment of the instant invention;

FIG. 2 is a fragmentary view of the heating apparatus of FIG. 1 including a longitudinal section of the combustion chamber; and

FIG. 3 shows a transverse section of the combustion chamber of FIG. 2 as taken along lines 3-3 of FIG. 2.
The front tumbler bulkhead 31 defines an access into the tumbling chamber that is substantially aligned with the access opening 23 in the front panel 19. The rear bulkhead 33 defines an opening receiving a perforate panel 49 through which airflow is directed into the tumbling chamber from a duct system as will be shown.

The tumbler sidewall 36 is supported on a generally horizontal axis by a system including a pair of rollers 50 supported on brackets 51 fixed to the rear bulkhead 33 and by a pair of slide bearings (not shown) supported by similar brackets fixed to the front bulkhead 31. The tumbler sidewall 36 could be supported entirely on rollers or entirely on slides as conditions permit. The fabric tumbler sidewall 36 is rotated by a belt 53 encompassing the periphery of the sidewall 36 and driven by a motor 54 mounted on the base 15.

The airflow system for the clothes dryer 10 includes a fuel burning heater supported adjacent the base and into which air is drawn from the atmosphere for heating prior to movement into the fabric tumbler 41. The heating system includes a fuel burner 60 and a combustion chamber 61 as will be discussed in greater detail hereinafter. The combustion chamber 61 is connected to a generally upwardly extending rear air duct 63 which conducts heated air from the combustion chamber 61 through the rear perforate panel 49 and into the tumbling chamber 41.

The air then flows from the chamber 41 through a filter assembly 64 into the front air duct 66. The filter assembly 64 includes a filter screen 65 supported within the air duct for removing lint particles from the air leaving the tumbling chamber 41. The air is drawn from the front air duct 66 into a blower assembly 69 from which it is forced through a rearwardly extending lower air duct 70. The blower 69 includes an impeller (not shown) that is driven by the motor 54 through the motor shaft 71. The general airflow pattern within the drying apparatus is shown by the broken and solid line arrows 74, 75 and 73 in FIG. 1.

Referring to FIG. 2, the heating system is shown in a longitudinal view including the combustion chamber 61 in section. FIG. 3 in turn shows a transverse section of the combustion chamber 61. The heating system includes the conventional burner 60 fed by an incoming gas line 76 and controlled by a valve mechanism 79. The burner 60 and valve 79 are fixed to the base 15 through a bracket 80. The heating system further includes the combustion chamber 61 comprising a pair of housing portions 82 and 83.

The first housing portion 82 is fabricated of sheet metal in the shape of a cone where the ends of the cone are both open and with the larger end 84 receiving the egress end of the fuel burner 60. The conical portion 82 is connected at the larger end 84 by a bracket 86 to the base 15 and is connected at the other or reduced end 85 to the second housing portion 83 as will be shown.

The second housing portion 83 is cylindrical and receives the smaller end 85 of the conical first housing portion 82 in an overlapping and radially spaced relationship. The opposite or rear end 90 of the cylindrical portion 83 extends into the upwardly extending air duct 63 at the rear of the dryer and is connected thereto by a bracket 89.

The forward end 91 of the cylindrical second housing portion 83 includes three circumferentially extending slots 93 spaced a short distance from the end of the housing 83 so that portions of the entry end 91 of the cylindrical housing 83 adjacent to the circumferential slots 93 may be deformed inwardly as if reversed relative to a chord line for contact with the periphery of the smaller end 85 of the conical housing portion 82 as best shown in FIG. 3. These three inwardly formed portions such as 94 may be described as longitudinally extending arcuately shaped flanges for effectively serving as connecting legs between the conical and cylindrical combustion housing portions 82 and 83. A threaded member 95 connects the two housing portions together at each of the three inwardly extending legs 94.

As best shown in FIG. 3, this connection between the two housing portions 82 and 83 defines a generally continuous annular air intake 96. The intake is completely annular except for the thickness of the sheet metal at the three inwardly extending legs 94.

It is thus seen, as best viewed in FIG. 2, that the combustion chamber construction disclosed in this application provides for a first air intake at the forward end 84 of the conical portion 82 in the space surrounding the burner nozzle 60 and a second air intake 96 at the annular connection between the two housing portions 82 and 83 which is intermediate the opposite ends of the combustion chamber 61.

It is also noted that the combustion chamber 61 is sloped upwardly with respect to the base 15 and is disposed on an axis parallel to the upwardly directed burner 60. The improved housing construction providing for an enlarged terminal portion of the combustion chamber 61 and for providing an intermediate secondary air intake 96 achieves improved burner operation by insuring sufficient combustion air, by minimizing contact of the flame with the wall of combustion chamber 61 to avoid formation of carbon monoxide resulting from incomplete combustion, and by facilitating increased airflow through the combustion chamber 61 to effectively reduce the temperature at the combustion chamber wall.

It is thus seen that the instant invention provides an improved heating apparatus for a gas burning clothes dryer wherein the efficiency of the burning apparatus is improved through a combustion chamber construction having an enlarged terminal portion along with an improved secondary air intake at an intermediate position of the combustion chamber.

In the drawings and specification, there is set forth a preferred embodiment of the invention and although specific terms are employed these are used in a generic and descriptive sense only and not for purposes of limitation. Changes in form and the proportion of parts as well as the substitution of equivalents are contemplated as circumstances may suggest or render expedient without departing from the spirit or scope of this invention as defined in the following claims.

I claim:

1. In a clothes dryer having a drying chamber, the combination comprising: a fuel burner supported within said clothes dryer; a combustion chamber including a first housing portion and a second housing portion, said first housing portion being generally conical and open at the enlarged end to receive the egress of said burner and to define a first air intake into said combustion chamber at said enlarged end, said second housing portion having a first end telescopically adjacent to and spaced radially outwardly from the reduced
5 end of said first housing portion; means for connecting said first and second housing portions together including legs formed integrally with said second housing portion at said first end thereof and extending inwardly and attached to the reduced end of said first housing portion for cooperatively connecting the two housing portions together to define said combustion chamber, the connection between the first and second housing portions defining a generally continuous annular second air intake into said combustion chamber intermediate the ends thereof; and means for connecting said combustion chamber in fluid communication with said drying chamber.

2. In a clothes dryer as defined in claim 1 wherein said second housing portion is generally cylindrical and receives the reduced end of said first housing portion in a longitudinally overlapping relationship.

3. In a clothes dryer as defined in claim 1 wherein said first and second housing portions are concentric to a common axis.

4. In a clothes dryer as defined in claim 1 wherein said first and second housing portions are each substantially imperforate whereby air ingress into said combustion chamber is limited to said first and second air intakes.

5. In a clothes dryer having a drying chamber, the combination comprising: a fuel burner supported within said clothes dryer on an axis inclined upwardly from a horizontal plane; a combustion chamber having an inclined axis generally parallel to the axis of said burner and including a first housing portion and a second housing portion, said first housing portion being generally conical and open at the enlarged end to receive the egress of said burner and to define a first air intake into said combustion chamber, said second housing portion being enlarged and including a thin wall member generally open at a first end to receive the reduced end of said first housing portion in a longitudinally overlapping radially outwardly spaced relationship, said second housing portion having at said first end a plurality of legs formed integrally with said second housing portion and comprising a generally annular portion of said thin wall member deformed radially inwardly at spaced circumferential positions for engagement with said first housing portion, said legs being attached to the reduced end of said first housing portion for cooperatively connecting the two housing portions together to define said combustion chamber, the connection between the first and second housing portions defining a generally continuous annular second air intake into said combustion chamber intermediate the ends thereof; and means for connecting said combustion chamber in fluid communication with said drying chamber.

6. In a clothes dryer as defined in claim 5 wherein the axis of said burner is spaced below the axis of said combustion chamber.

7. In a clothes dryer as defined in claim 5 wherein said second housing portion is cylindrical and wherein both housing portions are concentric to the inclined axis of said combustion chamber.

* * * * *