Sept. 21, 1943. J. D. LOVELEY 2,329,920

COMBUSTION CHAMBER

Filed Jan. 16, 1942 2 Sheets-Sheet 1

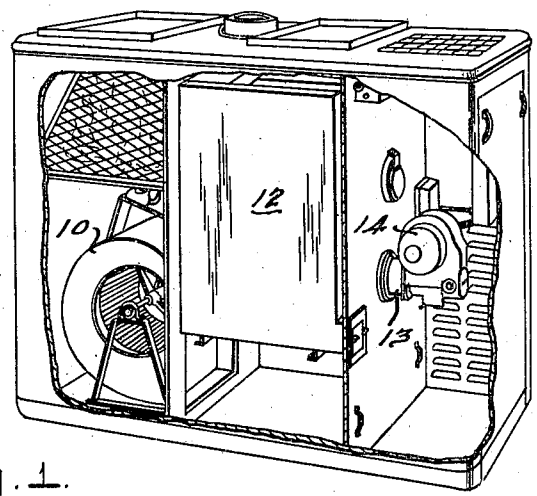


Fig. 1.

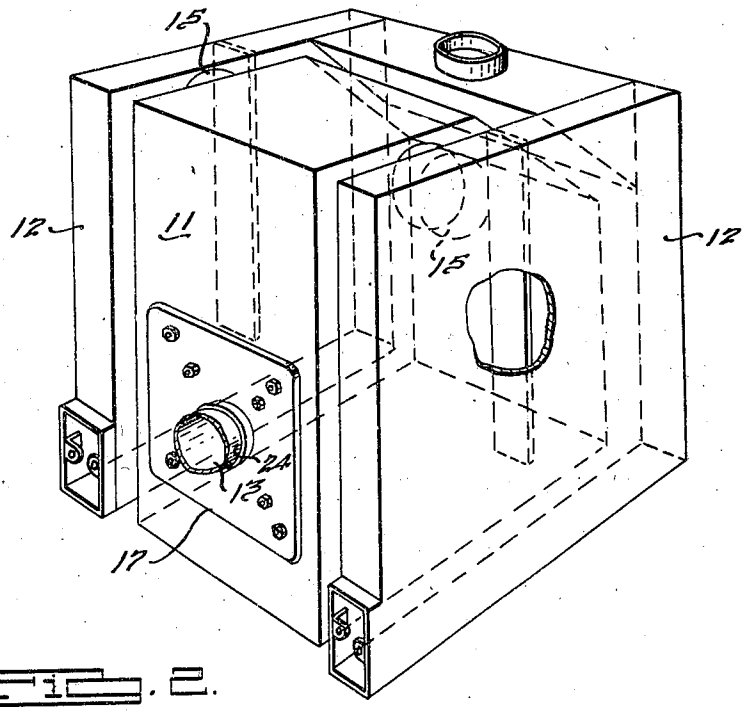


Fig. 2.

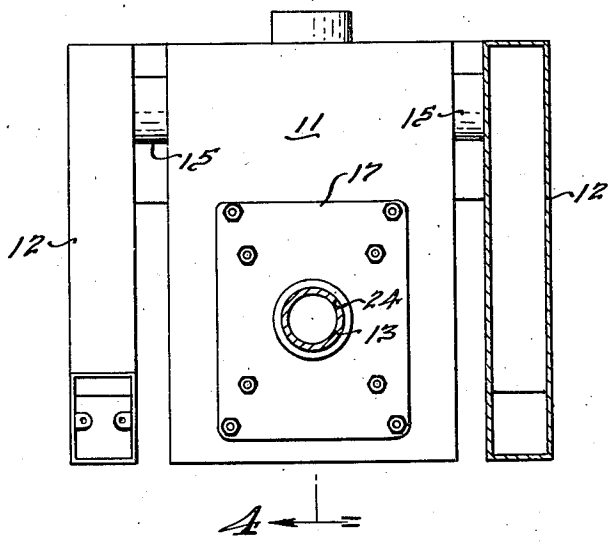
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Filed Jan. 16, 1942 2 Sheets-Sheet 2

FIG. 3.



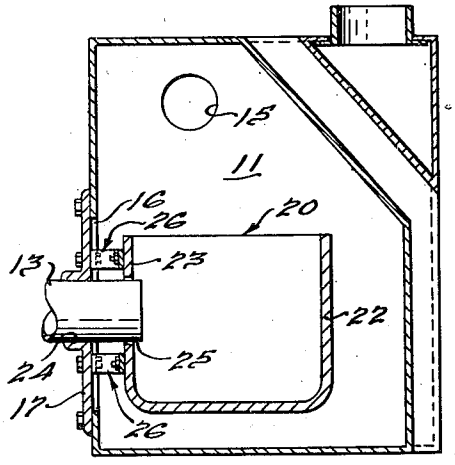


FIG. 4.

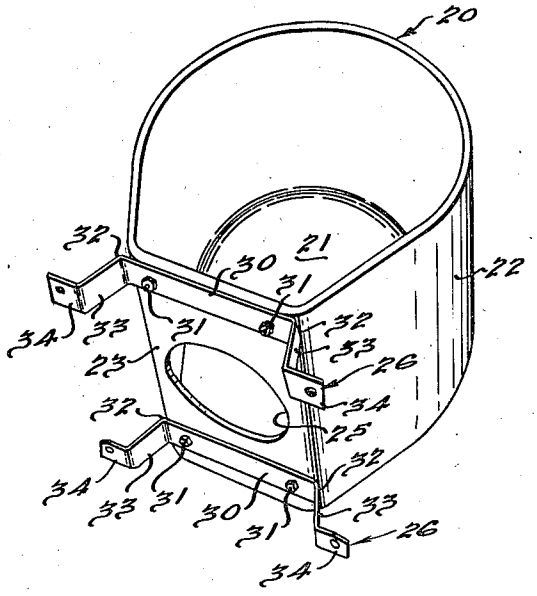


FIG. 5.

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UNITED STATES PATENT OFFICE

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COMBUSTION CHAMBER

Joseph D. Loveley, Dayton, Ohio, assignor to Chrysler Corporation, Detroit, Mich., a corporation of Delaware

Application January 16, 1942, Serial No. 427,001

3 Claims. (Cl. 158—4)

My present invention relates to heating appliances and in particular comprises an improved firepot for heating appliances.

The primary object of my invention is to provide a firepot of simple, sturdy construction and of readily available materials. Prior practices have included the constructing of firepots of ceramic material such as fire clay, of special alloy sheet metals, or of cast iron sections capable of expanding with respect to each other. The use of ceramic and similar material is objectionable since the mass of material is slow to heat or to cool, resulting in overrun temperatures in the space being heated, is bulky to package and to ship, and is subject to a high percentage of breakage during shipment and installation. The use of sheet metal of special alloy characteristics is objectionable since the elements used in forming heat resistant metals capable of withstanding high temperatures without buckling, scaling, or oxidizing, are very expensive and difficult to obtain, especially at the present time. The use of sectional cast iron pots is objectionable because of the relatively high cost and expensive mounting required.

The principal object of the present invention is to provide a one-piece cast iron firepot so constructed and mounted in the combustion chamber of a heating appliance as to be the full equivalent of a sheet metal firepot of special characteristics, such as 27% chrome steel. I have discovered that by the reason of my mounting arrangement I am able to use ordinary gray iron or similar cast iron of inexpensive type without danger of cracking the firepot by reason of unequal stresses and strains. By my present invention I am able to utilize a cast iron firepot placed in spaced relation to the walls of a combustion chamber as is present practice in heating appliances using sheet metal firepots. I have discovered that my arrangement permits the use of ordinary cast iron without danger of destruction of the firepot or the mounting thereof by the creation of unequalized strains as was previously thought to be the insurmountable reason for not using cast iron firepots suspended in combustion chambers.

The objects and advantages of the present invention will be more readily apparent to those skilled in the art from a study of the following specification taken in connection with the accompanying drawings wherein like numerals refer to like parts throughout.

In the drawings,

Fig. 1 discloses a heating appliance in which the present invention may be used;

Fig. 2 discloses the combustion chamber of a heating appliance of a type for which the present invention is adapted, said combustion chamber being such as disclosed in the patent to Allen P. Livar, No. 2,196,703, issued April 9, 1940.

Fig. 3 is a front elevational view of the combustion chamber disclosed in Fig. 2;

Fig. 4 is a vertical section taken substantially along line 4—4 of Fig. 3 and showing the present invention in the place of use; and

Fig. 5 is a view in perspective of a firepot and the mounting means therefor comprising the present invention.

For purposes of illustration I have illustrated the present invention in a winter air conditioning furnace although it should be readily apparent that the present invention may be used in other heating appliances, such as boilers, water heaters, space heaters, and the like. The furnace comprises a blower 10 adapted to force air around the walls of a combustion chamber 11 and attached radiators 12 as disclosed in the aforesaid patent. The present invention is adapted to be used in connection with burners of the type having a draft tube 13, such as the oil burner 14 illustrated in Fig. 1. The combustion chamber comprises a substantially complete enclosure except for the flue outlets 15 and an opening 16 of substantial size in a vertical wall thereof, the opening being closed by a mounting plate 17 having its edges overlapping and fastened to the edges of the opening 16.

The firepot 20 comprising the present invention includes a bottom wall 21 and substantially vertical side walls 22, preferably formed in teardrop shape with its largest diameter away from the point of admission of the flame, and a substantially vertical flat wall 23 adapted to be maintained substantially parallel to the mounting plate 17. The mounting plate 17 is provided with an opening 24 adapted to embrace the draft tube 13, and the wall 23 is provided with a similar opening 25 through which the end of the draft tube 13 projects into the firepot.

The firepot is suspended within the combustion chamber by means of a pair of brackets 26, each comprising a thin strip of sheet metal of relatively thin gauge in comparison to the thickness of the walls of the firepot 20, such as of the order of 16 to 20 gauge. The brackets 26 may be formed of special alloy steel such as nichrome, chrome steel or other stainless steel, but I have found that ordinary cold rolled steel is of suf-

ficient rigidity and the brackets are so placed as to be protected from oxidizing flames that long life should be achieved therewith. Each of the strips comprises a central portion 30 adapted to be fastened flat against the wall 23 in horizontal position, one above and one below the opening 25. Attachment of the strips to the wall 23 is achieved by bolts 31 at the corners of the wall 23, there being preferably a pair of such bolts to each strip and located at widely separated points. The laterally extending ends of the brackets 26 are bent outwardly away from the firepot at 32 to provide supporting arms 33 to hold the firepot spaced from the wall of the combustion chamber, and are reversely bent adjacent their ends to provide parallel portions 34 which may be fastened to the supporting plate 17. The size of the firepot is preferably such that the firepot may be mounted upon the mounting plate 17 and inserted through the opening 16 so that ready inspection and assembly is provided.

Preferably the corner edges of the firepot between the walls 22 and 23 and between the bottom and side walls are rounded so as to lessen the chances of unequal strains causing cracking at these points.

When the present invention is in use the flame projecting from the end of the draft tube 13 causes more intense heating at the far end of the firepot than at the points surrounding the opening 25. Heating of the wall 23 is achieved rather slowly by a combination of conduction from the far end of the firepot and of radiation from the flame and inside walls of the firepot. Since this heating takes place rather slowly, time is given for equalizing of strains so that the firepot is protected from cracking. Also, the relatively thin gauge strips 30 may buckle or stretch slightly if there is unequal expansion, and due to the relatively thin gauge thereof any unequal expansion between the side of the firepot and the brackets will be taken up in the portions 30 of the brackets.

Likewise, the distance between the bolts 31 may vary without affecting the mounting means silnce the supporting arm portions 33 may change their angular relation to the remainder of the bracket without causing undue strain on the mounting plate 17.

Having described and illustrated a preferred embodiment of my invention, it should be apparent to those skilled in the art that the same permits of various modifications in arrangement and detail. All such modifications as come within the scope of the following claims are considered a part of my invention.

I claim:

1. A heating appliance comprising a combustion chamber, an oil burner of the draft tube type having a draft tube projecting into said combustion chamber, a cast iron firepot suspended in said combustion chamber and having an open top, a closed bottom and substantially vertical side walls, a portion of one of said side walls having an opening therethrough through which the end of the draft tube of said oil burner projects, and means to suspend said firepot so that all portions thereof are held in spaced relation to the walls of said fire chamber consisting of a pair of thin gauge sheet metal strips fastened horizontally to said firepot, one above and one below said opening, each of said strips having outwardly bent ends fastened to a wall of said combustion chamber, and said strips being the sole support of said firepot.

2. A heating appliance comprising a combustion chamber having a vertical wall provided with a relatively large opening therethrough, a plate secured to the edges of said large opening and having a smaller opening therethrough, a pair of relatively light sheet metal strips, located one above and one below said smaller opening, fastened to said plate at their ends and having protruding central portions spaced from said wall, a cast iron firepot having a vertical wall fastened to the central portions of said strips and solely supported thereby with all portions thereof spaced from the walls of said combustion chamber, said firepot having an opening through its side wall maintained in substantially coaxial alignment with the opening through said plate, and a fuel burner comprising a draft tube extending into said firepot through the aligned openings in said plate and said firepot.

3. A heating appliance comprising a combustion chamber having a vertical wall provided with a relatively large opening therethrough, a plate secured to the edges of said large opening and having a smaller opening therethrough, a pair of relatively light sheet metal strips, located one above and one below said smaller opening, fastened to said plate at their ends and having protruding central portions spaced from said wall, a cast iron firepot having a vertical wall fastened to the central portions of said strips and solely supported thereby with all portions thereof spaced from the walls of said combustion chamber, said firepot having an opening through its side wall maintained in substantially coaxial alignment with the opening through said plate, and a fuel burner comprising a draft tube extending into said firepot through the aligned openings in said plate and said firepot, the relatively large opening through said vertical wall of the combustion chamber being of such extent with respect to the all-over dimensions of said firepot that the firepot may be removed from said combustion chamber while attached to said plate.

JOSEPH D. LOVELEY