Dec. 8, 1936. J. E. MEES 2,063,261

REFRACTORY LINING SUPPORT FOR HOME HEATING UNITS

Filed March 2, 1936 2 Sheets-Sheet 1

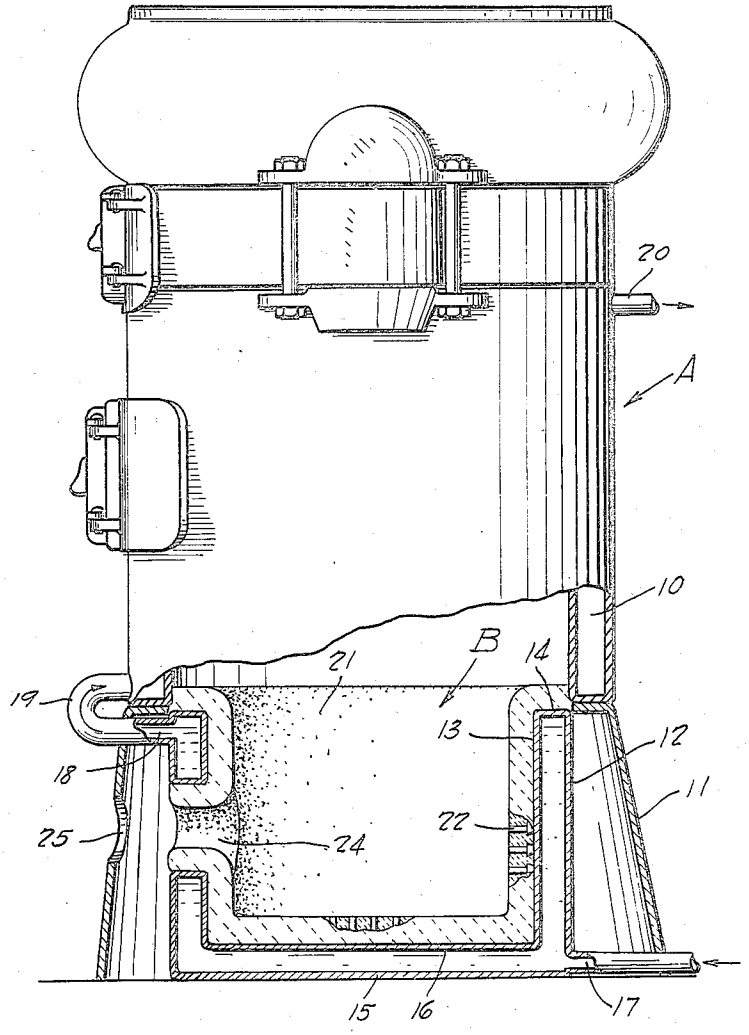


FIG. 1

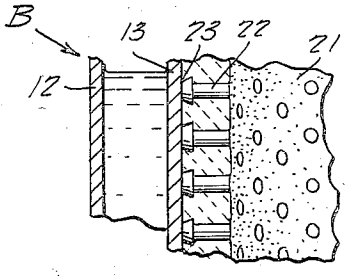


FIG. 2

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REFRACTORY LINING SUPPORT FOR HOME HEATING UNITS

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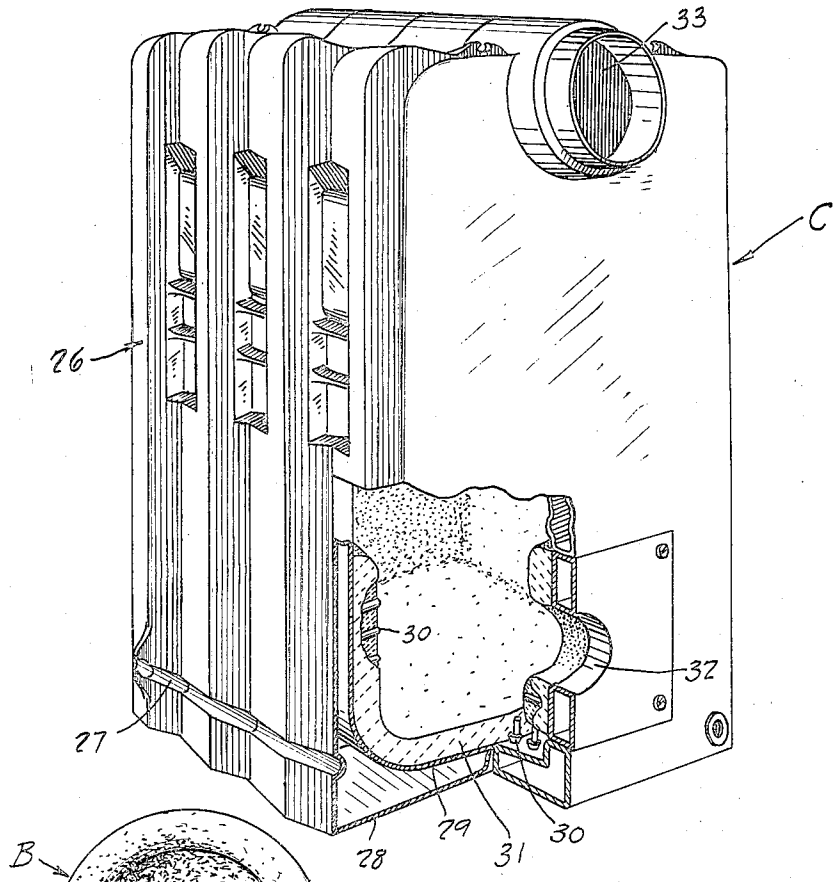


FIG. 4

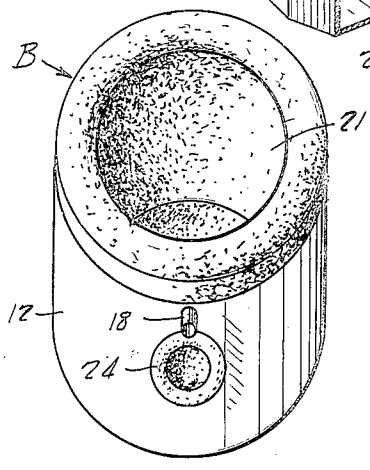


FIG. 3

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REFRACTORY LINING SUPPORT FOR HOME HEATING UNITS

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5 Claims. (Cl. 122—368)

This invention relates to heating units such as are commonly employed for home heating purposes and is concerned primarily with that type of heating unit which consumes liquid or gaseous fuel.

Today the practice of heating an ordinary home, and similar places, by a heating unit which avails of an oil burner as a source of heat supply is becoming prevalent and widespread, and this practice has assumed two distinct phases in the manner in which it is carried out in practical embodiments. In those instances where old coal consuming furnaces are already installed, fire pot units are availed of to convert the furnace to oil burning use, but where no such furnace is available, a complete installation designed for oil burning is employed. Whether the installation be new and complete for oil burning purposes or of the conversion type, the heating units are, in a larger number of instances, designed for use with hot water or steam heating systems and this invention is directly tied up with heating systems of this character.

From their very nature, hot water and steam heating systems require that the heating unit function by having the heat of the fuel consumed transferred to a heating medium which, in the first instance, is always water. The old type furnace ordinarily includes a water jacket above the location of the fire pot which is installed and there have been proposed certain constructions in which the walls of the fire pot are tubular in character so that water may circulate thereabout to more efficiently conduct the heat from the point of fuel consumption, and in new installations, the water circulatory system has been carried down about the point of fuel consumption to this same end of efficiency.

It has been found, however, in actual practice, that in these latter cases it is necessary to cover the inner walls of the tubular parts defining the water circulatory system by a refractory material due to the close proximity of these walls to the point of fuel consumption. Heretofore, it has been necessary to make such refractory protective coatings very thin due to the necessity of providing for the conductivity of the heat to the water in the circulatory system.

With the foregoing conditions in mind, this invention has in view, as an important objective, the provision of a heating unit of the character above described in which the walls about the point of fuel consumption are protected by a refractory lining which is supported in position by metallic supporting members or studs which outstand from the walls about the point of fuel consumption through the refractory material. When such an arrangement is employed, the studs are effective not only to provide a highly efficient support for the refractory lining to prolong the service life of same, but also constitutes a means for conducting heat to the water in the jacketed walls about the point of fuel consumption.

The refractory also conducts heat to the water in the walls, provides a means of heat storage and also affords a radiant surface which transfers heat back into the furnace gases. These features in proper combination are known to result in greatest economy of fuel.

Ordinarily, refractory materials are not good conductors of heat whereas the metal studs are, and it is, therefore, practical to employ a thicker refractory lining than has heretofore been permissible.

Inasmuch as this invention proposes the provision of a refractory lining support which insures of adequate and complete coverage and protection for the walls about the point of fuel consumption, another objective in view is the provision of a fire pot unit designed for converting ordinary furnaces to oil burning use and which fire pot unit is of a highly simplified construction. In carrying this idea out in a practical embodiment, the fire pot is defined by a double shell wall, the shells of which are spaced apart to provide for the circulation of water therebetween. Such a double shell construction is not only of a more simple nature than the tubular constructions now available to the public, but is also advantageous in that it provides for a full and more complete circulation of the water about the point of fuel consumption.

The invention also has in view, as an objective, the provision of a heating unit including a double shell bottom which is disposed beneath the point of fuel consumption and the inner wall of which is protected by a refractory lining which is maintained in position by metallic supporting members or studs which upstand from the bottom through the refractory material.

Other more detailed objects and advantages which are associated with the carrying out of the above noted thoughts in a practical embodiment will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

The invention therefore comprises a heating unit designed for home use and which consumes liquid or gaseous fuel. The heating unit includes

a fire pot about the point of fuel consumption which is defined by a double shell wall through which water circulates and the inner wall of which is protected by a refractory lining supported in position by metallic studs which extend inwardly from the inner wall through the refractory material. The invention also embraces heating units which are new installations designed for oil burning, the walls about the point of fuel consumption being protected by a refractory lining supported in position in the manner above outlined.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawings, wherein:

Figure 1 is a side view, partly in section and partly in elevation, of an ordinary furnace which has been converted for use with an oil burner, the fire pot unit being shown in section;

Figure 2 is an enlarged detailed view in section of a portion of the double shell wall defining the fire pot;

Figure 3 is a detailed view in perspective of a fire pot unit which is installed as such; and

Figure 4 is a perspective view, parts being broken away and shown in section, of a new installation designed for oil burning.

Referring now to the drawings, wherein like reference characters denote corresponding parts, a conventional furnace construction is shown in Figure 1 and designated A. The upper part of the furnace A includes a water jacket designated 10 through which the water which is heated by the consumption of fuel circulates. The lower part of the furnace A is enlarged in diametrical dimension, as indicated at 11, and in this enlarged portion 11 is located a fire pot unit which converts the furnace A for use with an oil burner. This fire pot unit is referred to in its entirety by the reference character B.

The fire pot unit B is defined by a double shell wall construction comprising an outer wall 12 and an inner wall 13, the walls 12 and 13 being spaced apart and connected at their upper edges by a ring-like wall portion 14 which may be integral with the walls 12 and 13 as shown in Figure 1. The bottom of the fire pot unit B is also of a double shell construction, being defined by an outer bottom wall 15 and an inner bottom wall 16, which bottom walls 15 and 16 may be integral with the walls 12 and 13 as shown in the drawings.

A water inlet for the fire pot unit B is shown at 17 and an outlet at 18 which is placed in conductive communication with the water jacket 10 of the furnace A by a connection shown at 19. A water outlet for the water jacket 10 is designated 20 and this outlet conducts the heated water to the heating system which is employed in conjunction with the furnace A.

The inner walls 13 and 16 are protected by a refractory lining indicated at 21. This refractory lining 21 is preferably applied in a plastic state to the respective walls 13 and 16 and is held in position on these walls by metallic studs 22 which outstand therefrom.

Referring now more particularly to Figure 2, these metallic studs 22 are shown as being anchored on the wall 13 as by welding at 23. Obviously, the invention is not to be limited in this respect, however, as any approved means of anchoring the studs to the walls may be employed. This invention also contemplates a construction in which the inner walls of the fire pot unit B have the studs 22 formed integral therewith.

The fire pot unit B is formed with an opening at 24 through which the connections (not shown) of the oil burner pass and this opening finds its counterpart in the opening 25 of the wall 11 of the furnace A. The heating unit B is installed in the furnace A to convert it to oil burning use.

The consumption of fuel takes place in the fire pot B and the walls 13 and 16 are covered and protected from the great heat created at this point by the refractory lining 21. At the same time, this heat is effectively conducted to the water between the walls 12 and 13, 15 and 16, by the metallic studs 22 and the refractory 21. Due to this conduction of the heat, it is feasible to make the refractory lining 21 sufficiently thick to provide for a long service life thereof.

Ordinarily, the various walls of the heating unit B will be made from steel, but the invention is not to be limited in this respect as, obviously, other materials could be used. Likewise, the studs 22 could be made from any suitable material, such as steel.

Referring now more particularly to Figure 4, an installation which is complete in itself and which is designed for oil burning use is shown and referred to by the reference character C. This installation C may be made up of a plurality of sections 26 which are maintained in assembled relation by a tie-rod connection which is located in the groove shown at 27. Each of the sections 26 are of a double shell construction such as made up of an outer wall 28 and an inner wall 29.

Outstanding from the inner wall 29 are metallic studs 30 which are similar to the studs 22 shown in Figures 1 and 2. These studs 30 carry and maintain in a supported position a refractory lining 31 which may be carried upon the inner wall 29 as far as service conditions require. As shown in Figure 4, this refractory lining 31 has been extended upwardly a distance proportionate to the height of the fire pot B.

The unit C is formed with an opening at 32 through which the connections to the oil burner pass, and provision is made at 33 for a flue connection. The installation C functions in much the same manner as the fire pot unit B with the studs 30 assisting in conducting the heat provided by fuel consumption to the water located between the spaced walls 28 and 29.

While preferred specific embodiments of the invention are hereinbefore set forth, it is to be clearly understood that I am not to be limited to the exact constructions illustrated and described because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

I claim:—

1. In a home heating unit of the character described, a double shell wall structure about the zone of fuel combustion, said wall structure comprising inner and outer walls, metallic studs outstanding inwardly from the inner wall, and a refractory lining on said inner wall maintained and supported in position by said studs.

2. In a home heating unit of the character described, a double shell bottom disposed beneath the zone of fuel combustion and comprising inner and outer walls, metallic studs extending upwardly from the inner wall, and a refractory lining on the inner face of said inner wall maintained and supported in position by said studs.

3. A fire pot for use with home heating units defining the zone of fuel combustion and compris-

ing an inner wall, an outer wall spaced from the inner wall to provide for the circulation of water therebetween, metallic studs anchored to the inner face of said inner wall and outstanding inwardly therefrom, and a refractory lining on the inner face of the inner wall about said studs.

4. A home heating unit designed for the consumption of fuel oil or gas comprising vertically extending inner and outer walls spaced apart, a bottom defined by inner and outer walls also spaced apart, said walls and bottom defining the zone of fuel combustion, metallic studs extending inwardly from the inner faces of said inner walls, and a refractory lining maintained and supported in position on said inner walls by the said metallic studs.

5. A home heating unit designed for use with oil or gas burners comprising vertically extending inner and outer walls spaced apart to provide for the circulation of water therebetween, a bottom defined by inner and outer walls integrally connected with said vertically extending inner and outer walls, said walls and bottom defining the zone of fuel combustion, metallic studs outstanding from the inner faces of said inner walls and a refractory lining on the inner faces of said inner walls maintained and supported in position by said metallic studs.

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