June 4, 1946. A. D. OLDS 2,401,502

HEATING UNIT

Filed June 6, 1942 2 Sheets-Sheet 1

Fig. 1.

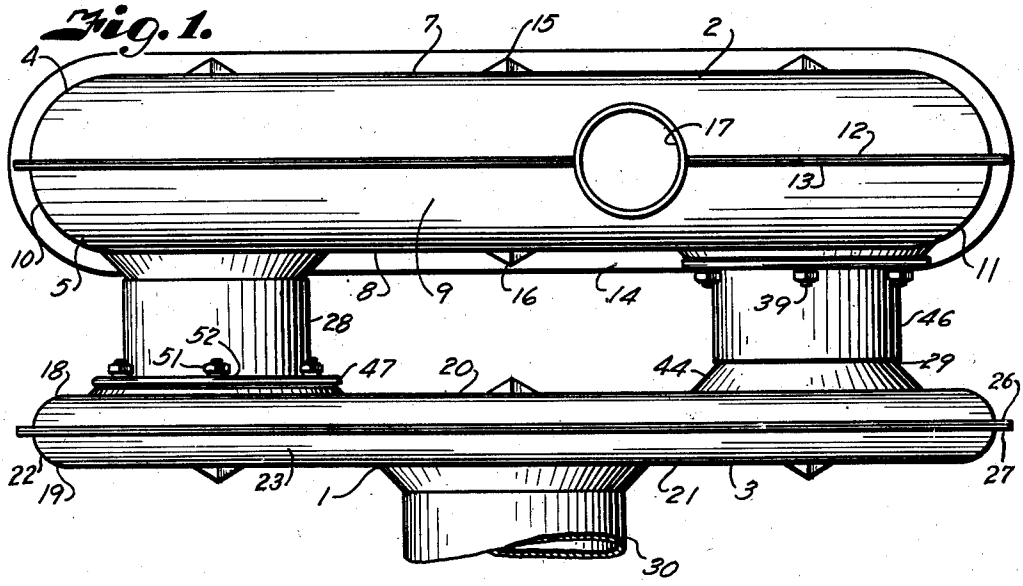
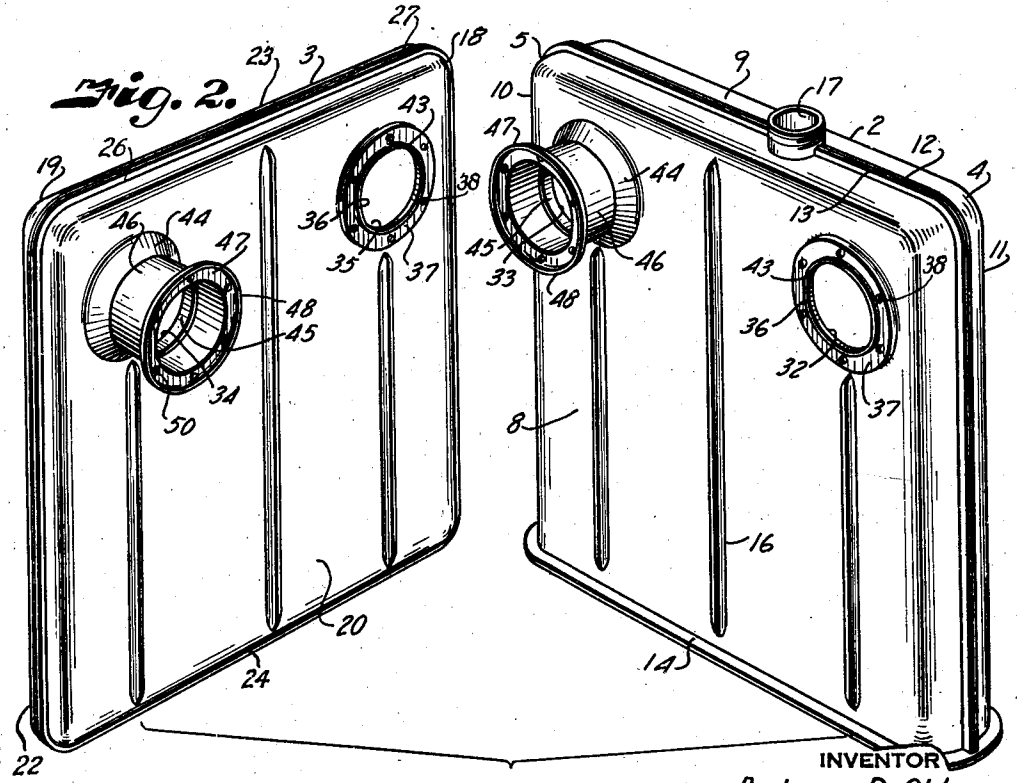


Fig. 2.



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Filed June 6, 1942 2 Sheets-Sheet 2

Fig. 3.

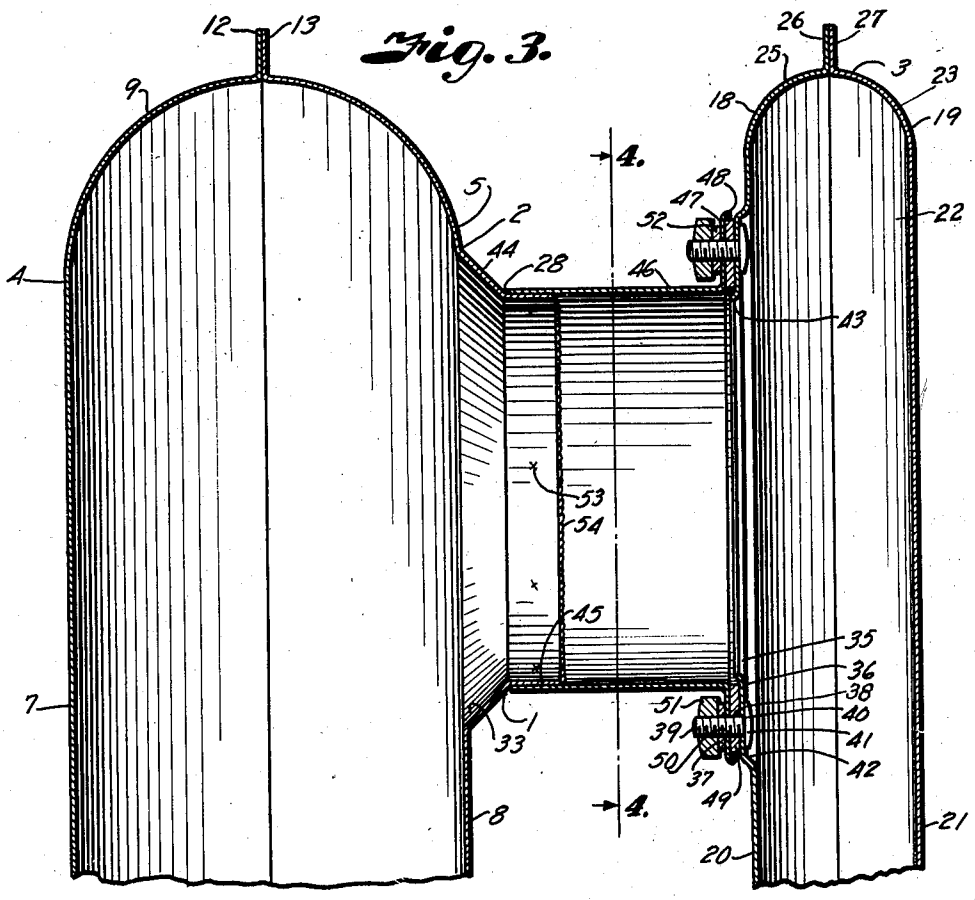
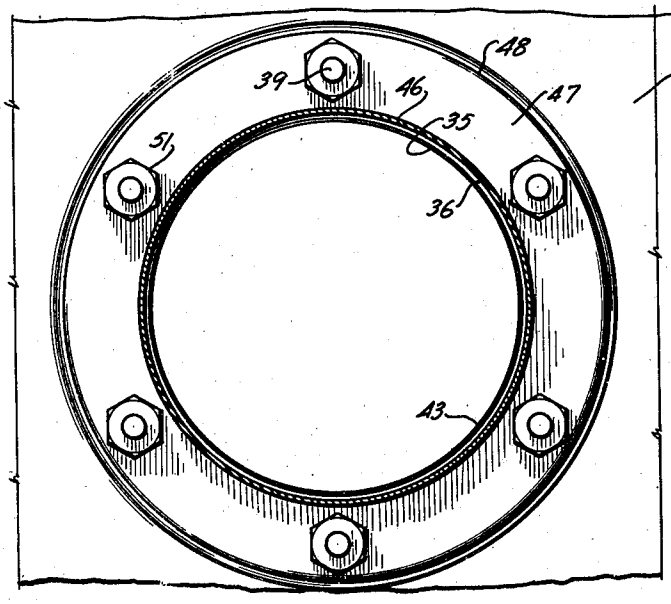


Fig. 4.



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HEATING UNIT

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Application June 6, 1942, Serial No. 446,003

4 Claims. (Cl. 126—99)

1

This invention relates to heating units such as those used in warm air furnaces and which include laterally juxtaposed combustion chamber and radiator sections spaced apart to provide air circulation therebetween.

When such units are applied in floor or similar compactly arranged furnaces, it is difficult to make the flue connections between the radiator and combustion chamber sections.

It is, therefore, the object of the present invention to provide a unit of this character with flues that may be readily connected so as to simplify assembly, reduce manufacturing costs and at the same time provide gas-tight connections.

In accomplishing this and other objects of the invention, I have provided structure illustrated in the accompanying drawings wherein:

Fig. 1 is a plan view of a heating unit embodying the features of the present invention.

Fig. 2 is a perspective view of the combustion chamber and radiator sections of the heating unit, illustrating the flue connections before the sections are secured together.

Fig. 3 is an enlarged section through the upper portion of the combustion chamber and radiator sections taken at one of the flue connections.

Fig. 4 is a cross-section through one of the flue connections on the line 4—4 of Fig. 3.

Referring more in detail to the drawings:

1 designates a heating unit particularly designed for use in a floor furnace structure and which includes a combustion chamber section 2 and a radiator section 3. When such units are used in floor furnaces they must be of relatively compact arrangement and provide a maximum heating area relative to the capacity of the combustion chamber. Consequently the combustion chamber 2 is of elongated cross-section and is formed of mating pan-like members 4 and 5 having relatively flat side faces 7 and 8 curving laterally at the upper and side marginal portions thereof, as at 9, 10 and 11, to be interconnected by flanges 12 and 13 that are preferably welded together to form a gas-tight joint. The lower portion of the combustion chamber is open to accommodate the burner of a furnace in which the unit is installed and the lower edges of the combustion chamber walls are flanged outwardly to provide a footing flange 14 for attachment to the bottom of the furnace casing.

To compensate for expansion and contraction incidental to heating and cooling of the metal, the side walls 7 and 8 are provided with expansion ribs 15 and 16 of any suitable formation, but are shown in the drawings as being of substantially V-shaped cross-section, as best shown in Fig. 1.

2

The top of the combustion chamber is provided with a service door opening 17 through which the burner may be lighted, as in conventional floor furnace construction.

The radiator section 3 also consists of mating pan-like members 18 and 19 having relatively flat sides 20 and 21 and side, top, and bottom marginal portions 22, 23 and 24 curved inwardly, as at 25, and which have flanges 26 and 27 welded together to form a gas-tight radiator chamber. The sides 20 and 21 of the radiator section also have expansion ribs similar to those of the combustion chamber section previously described.

Due to the relatively narrow and elongated construction of the combustion chamber and radiator sections, it is desirable to provide a pair of flue connections 28 and 29 connecting upper corners of the respective sections so that the hot products of combustion are caused to move substantially uniformly over the inner surfaces of the respective sections on their way to discharge through a flue connection 30, which is preferably located in the side 21 of the radiator section near the lower portion thereof and intermediate the flue connections 28 and 29.

Owing to the relatively narrow space 31 between the combustion chamber and radiator sections, the flue connections 28 and 29 are relatively short, and it is difficult to make gas-tight connections therebetween. The relatively close space between the flue connections also makes it difficult to weld the collars composing the connections to the respective sections. Therefore, the present invention contemplates improved flue connections which may be readily assembled at low cost, provide accurate alignment of the section, and gas-tight joints, as now to be described.

The facing side walls of the respective sections are provided in the upper corners thereof with openings 32—33 and 34—35. The openings 32 and 35 are encircled by flanges 36 struck outwardly from the plane of the side walls 7 and 20 so that the flat faces 37 thereof are offset slightly from the planes of the walls and seat gaskets, later described. The flanges are provided with a series of openings 38 for passing the shanks 39 of bolts 40 having their heads 41 located within the recesses 42 formed by the offset flanges as best shown in Fig. 3 and the heads are preferably welded therein so as to prevent rotation when nuts are applied to the shanks thereof, as later described. In order to center the gasket, the in-

ner edges of the flanges 36 are preferably turned outwardly as shown at 43.

The portions of the side walls which encircle the openings 33 and 34 are belled outwardly as shown at 44 and terminate in laterally projecting collars 45. Sleeved upon the collars 45 are collars 46 having their outer ends provided with laterally extending annular flanges 47 and which have inturned marginal edges 48 cooperating with the edges 43 to retain a gasket 49 therebetween. The flanges 47 have openings 50 to pass the shanks 49 of the bolts 40 so that they are adapted to be secured to the flanges 36 by nuts 51 which are drawn tight on the shanks of the bolts and retained from retractive rotation by lock washers 52.

In assembling the sections, the collars 46 are spot welded to the collars 45 as indicated at 53, Fig. 3, to properly locate them, after which a seam weld is formed about the collars, as indicated at 54, Figs. 1 and 3. It is obvious that the parts of the respective flue connections are reversed with respect to each other. Therefore, the seam welds may be readily effected about one of the collars without interference with the other collar since one collar is mounted upon the combustion chamber and the other upon the radiator section. The sections are then readily connected by bringing them into juxtaposition so that the flanges 47 set against the gaskets 49 bearing upon the faces 37 of the flanges 36, with the openings in the flanges 47 passing the shanks 39 of the bolts 40. The lock washers 52 are then applied, followed by the nuts 51, which are drawn tight against the washers to compress the gaskets 49 between the flanges 36 and 47 and form gas-tight connections.

From the foregoing it is obvious that I have provided a radiator unit having flue connections which are readily connected at low assembly cost and provide rigid, gas-tight joints between the respective sections of the heating unit.

What I claim and desire to secure by Letters Patent is:

1. A heater unit including radiator and combustion chamber sections, each having a relatively flat side wall and arranged with said wall of one section in facing spaced parallel relation with said wall of the other section, said relatively flat side wall of said combustion section having a pair of laterally spaced openings therein, and said relatively flat side walls of said radiator section also having a pair of laterally spaced openings therein in registry with the openings in said side wall of said combustion section the four openings thus forming a first set of registering openings and a second set of registering openings laterally spaced from the first such set, an annular neck integral with said side wall of the radiator section and encircling the opening therein of the first set of openings, a similar annular neck integral with the side wall of the combustion chamber section and encircling the opening therein of the second set of openings, a flange on the combustion chamber section encircling the opening therein of the first set of openings, a flange on the radiator section encircling the opening therein of the second set of openings, collars having flanges registering with the first-named flanges, annular welds connecting the collars coaxially with said necks, said welds being spaced from said side walls to prevent buckling of the flat side walls by heat conducted through the necks from the welds, and fastening devices extending through said registering flanges for removably connecting the sections together.

2. A heater unit including radiator and combustion chamber sections, each having a relatively flat side wall and arranged with said wall of one section in facing spaced parallel relation with said wall of the other section, said relatively flat side wall of said combustion section having a pair of laterally spaced openings therein, and said relatively flat side walls of said radiator section also having a pair of laterally spaced openings therein in registry with the openings in said side wall of said combustion section the four openings thus forming a first set of registering openings and a second set of registering openings laterally spaced from the first such set, a neck having a bell-shaped portion with the base thereof integral with said side wall of the radiator section and encircling the opening therein of the first set of openings and having a coaxial cylindrical portion projecting from the smaller end of the bell portion, a similar bell-shaped neck having the base thereof integral with the side wall of the combustion chamber section and encircling the opening therein of the second set of openings and having a coaxial cylindrical portion, a flange on said wall of the combustion chamber section encircling the opening therein of the first set of openings, a similar flange on the radiator section encircling the opening therein of the second set of openings, collars having one of their ends sleeved coaxially of the cylindrical portions of the necks and having flanges on the other ends registering with the respective first-named flanges, annular welds connecting the collars with the cylindrical portions of said necks, and fastening devices extending through said registering flanges for removably connecting the sections together.

3. A heater unit including radiator and combustion chamber sections, each having a relatively flat side wall and arranged with said wall of one section in facing spaced parallel relation with said wall of the other section, said relatively flat side wall of said combustion section having a pair of laterally spaced openings therein, and said relatively flat side walls of said radiator section also having a pair of laterally spaced openings therein in registry with the openings in said side wall of said combustion section the four openings thus forming a first set of registering openings and a second set of registering openings laterally spaced from the first such set, a neck having a bell-shaped portion with the base thereof integral with said side wall of the radiator section and encircling the opening therein of the first set of openings and having a coaxial cylindrical portion projecting from the smaller end of the bell portion, a similar bell-shaped neck having the base thereof integral with the side wall of the combustion chamber section and encircling the opening therein of the second set of openings and having a coaxial cylindrical portion, a flange on said wall of the combustion chamber section encircling the opening therein of the first set of openings and offset outwardly from the plane of said wall, a similar offset flange on the radiator section encircling the opening therein of the second set of openings, collars having one of their ends sleeved coaxially of the cylindrical portions of the necks and having flanges on the other ends registering with the first-named flanges, annular welds connecting the collars with the cylindrical portions of said necks, and fastening devices extending through said registering flanges for removably connecting the sections together.

4. A heater unit including radiator and combustion chamber sections, each having a rela-

tively flat side wall and arranged with said wall of one section in facing spaced parallel relation with said wall of the other section, said relatively flat side wall of said combustion section having a pair of laterally spaced openings therein, and said relatively flat side walls of said radiator section also having a pair of laterally spaced openings therein in registry with the openings in said side wall of said combustion section the four openings thus forming a first set of registering openings and a second set of registering openings laterally spaced from the first such set, a neck having a bell-shaped portion with the base thereof integral with said side wall of the radiator section and encircling the opening therein of the first set of openings and having a coaxial cylindrical portion projecting from the smaller end of the bell portion, a similar bell-shaped neck having the base thereof integral with the side wall of the combustion chamber section and encircling the opening therein of the second set of openings and

having a coaxial cylindrical portion, a flange on said wall of the combustion chamber section encircling the opening therein of the first set of openings and offset outwardly from the plane of said wall to provide an annular recess within said combustion chamber section, a similar offset flange on the radiator section encircling the opening therein of the second set of openings and providing a similar annular recess in said radiator section, collars having their ends sleeved coaxially of the cylindrical portions of the necks and having flanges on the other ends registering with the first-named flanges, annular welds connecting the collars with the cylindrical portions of said necks, fastening devices having heads anchored in said recesses and having threaded shanks extending through said registering flanges, and nuts on the threaded shanks to draw the flanges on the collars into sealing relation with said offset flanges.

AMBROSE D. OLDS.