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PREFABRICATED FURNACE

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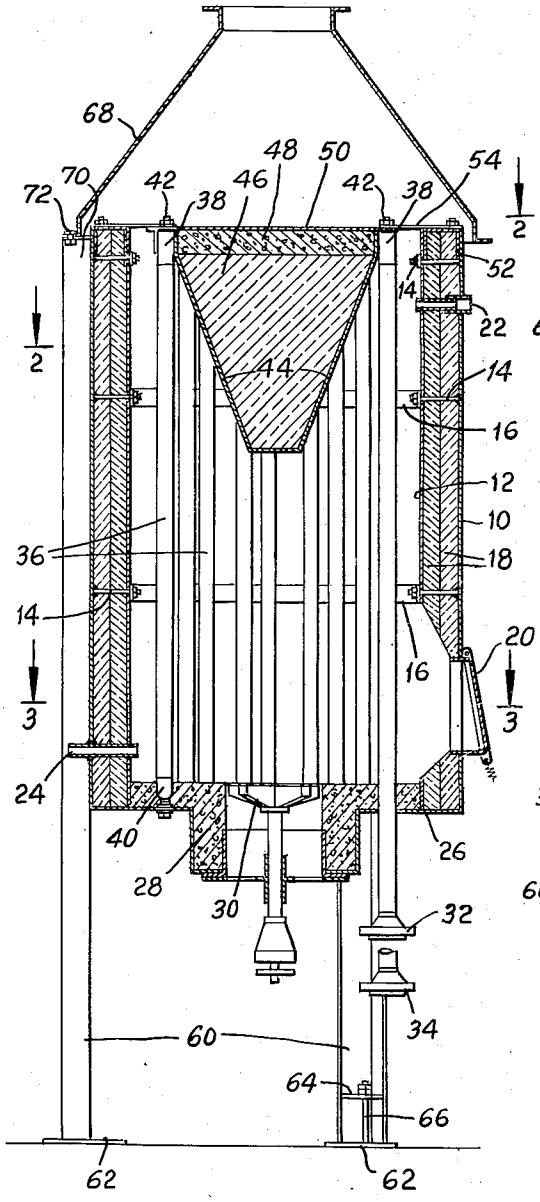

FIG. 1

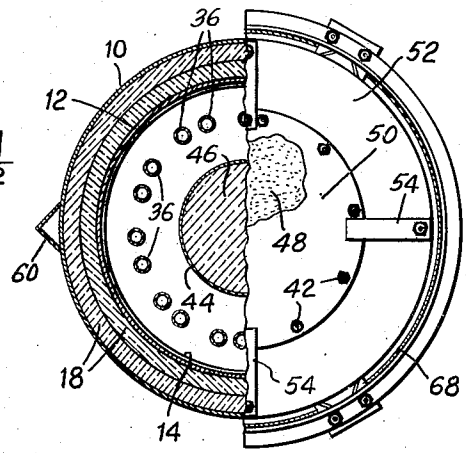

FIG. 2

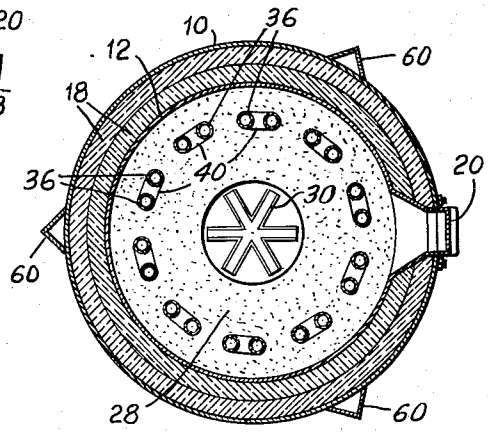

FIG. 3

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PREFABRICATED FURNACE

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3 Claims. (Cl. 122—356)

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This invention pertains to a type of furnace which may be completely prefabricated, with tubes and burners installed in the shop. An object of the invention is to provide a furnace which is peculiarly adapted to be completely prefabricated and shipped to the site completely assembled, and is made ready for operation by simply putting the unit on a foundation and bolting it in place.

Further and other objects and advantages will be apparent from the specification and claims, and from the accompanying drawings which illustrate what is now considered to be a preferred embodiment of the invention.

Referring to the drawings:

Figure 1 is a vertical cross-section through the center of the structure;

Fig. 2 is a cross-section on line 2—2 of Fig. 1; and

Fig. 3 is a cross-section on line 3—3 of Fig. 1.

The furnace comprises a vertical outer cylindrical shell 10, within which, and spaced from it, is a concentric inner shell or metal liner 12 supported by horizontal studs 14 having their heads welded to the shell and having their inner threaded ends supporting bar rings 16.

The annular space between shell 10 and liner 12 is occupied by two layers of solid insulation 18 such as monobloc.

An observation door is provided at 20, thermometer and draft gauge connections are provided as at 22, and flame control at 24.

A steel bottom plate 26 having a central opening and a depression to form an annular bottom well, is provided at the bottom of the shell and the well is filled with concrete 28, leaving a center space for a burner 30.

The inlet for fluid to be heated is at 32 and the outlet at 34. The fluid travels through a ring of vertical tubes 36 connected at top and bottom by welded tube turns or return bends 38 and 40 respectively, the bottom turns resting in concrete 28. The tubes may be interconnected either in series or in multiple to form a continuous coil. The welded tube turns or return bends at the bottom are embedded in the concrete bottom and support the tubes and a hollow cone 44.

Supported on the upper tube turns by bolts 42 is the hollow cone 44 which is filled with vermiculite 46 covered by a layer of concrete-mix 48. The top of the cone is then closed with a metal cover plate 50 welded to the top of the cone, large enough to overhang and rest upon the upper tube turns to which it is fastened and perforated to receive the bolts 42.

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The top of the furnace wall is surmounted by an L-ring 52 held in place by the upper studs 14. Four horizontal radial cone guides 54 are bolted to the L-ring and extend over the cone cover plate 50 so as to hold the cone and tubes in place during shipment of the furnace. These guides are relatively light metal strips which may flex to accommodate the upward expansion of the tubes which are supported rigidly only at the bottom.

The entire structure above described is supported at desired height above ground level by three vertical angle iron reinforcing beams or legs 60 welded to outer shell 10 from top to bottom of the shell, and extending sufficiently below the shell to support the furnace at desired height above ground level.

The lower ends of legs 60 are provided with foot plates 62 and brackets 64 to accommodate anchor bolts 66.

Mounted on the upper ends of legs 60 which extend laterally beyond the outer surface of the shell 10, is a conical smokestack 68, the bottom of which is of large enough diameter to provide an annular space 70 to admit cool air to be drawn into the bottom of the stack along its walls by thermal action when the furnace is in operation. The smoke stack 68 is fastened to the legs 60 by bolts 72.

It is to be understood that the invention is not limited to the specific embodiment herein illustrated and described, but may be used in other ways without departure from its spirit as defined by the following claims.

What is claimed is:

1. A unitary portable furnace adapted to be prefabricated for shipment to the site, comprising concentric vertical cylindrical shells spaced one within the other by interposed layers of insulating material, stiffening bar rings within the inner cylindrical shell and spaced longitudinally thereof, radial bolts tying the outer and inner cylindrical shells together, holding the insulation in place and fastened to the bar rings at their inner ends to unify the structure, a bottom plate with a central opening and a depression to form an annular bottom well, a cylindrical bank of vertical tubes spaced within the inner shell and concentric therewith, return bends attached to the tubes and interconnecting them at their ends to form a continuous fluid heating coil, a concrete bottom filling the annular bottom well and embodying the bottom return bends of the coil so that the coil is solidly supported from the bottom by the concrete, a hollow sheet metal inverted cone filled with concrete and having a large cir-

cular disc top plate, the inverted bottom end of the cone and the disc being of such size that the cone fits within the upper ends of the tubes of the coil and the disc overlaps the tubes at the top and is bolted to the upper return bends, angle iron legs welded to the outer wall of the outer shell of the furnace, extending with their upper ends flush with the shell at the top and elongated at the bottom to support the furnace well above the permanent base or floor to which the furnace is adapted to be secured, a conical chimney affixed to the top of the angle iron legs concentric with the furnace at the top and overhanging the furnace shell to form an annular cool air opening into the cone of the chimney, and a central axial burner mounted within the annular bottom well and affixed thereto.

2. A unitary portable furnace adapted to be prefabricated for shipment to the site, comprising concentric vertical cylindrical shells spaced one within the other by interposed layers of solid insulating material, radial bolts tying the outer and inner cylindrical shells together and holding the insulation in place, a bottom plate with a central opening and a depression to form an annular bottom well, a cylindrical bank of vertical tubes spaced within the inner shell and concentric therewith, return bends attached to the tubes and interconnecting them at their ends to form a continuous fluid heating coil, a concrete bottom filling the annular bottom well and embodying the bottom return bends of the coil so that the coil is solidly supported from the bottom by the concrete, a hollow sheet metal inverted cone filled with concrete and having a large circular disc top plate, the inverted bottom end of the cone and the disc being of such size that the cone fits within the upper ends of the tubes of the coil and the disc overlaps the tubes at the top and is bolted to the upper return bends, angle iron legs welded to the outer wall of the outer shell of the furnace, extending with their upper ends flush with the shell at the top and elongated at the bottom to support the furnace well above the permanent base or floor to which it is adapted to be secured, a conical chimney affixed to the top of the angle iron legs concentric with the furnace at the top and overhanging the furnace shell to form an annular cool air opening into the cone of the chimney, and a central axial burner mounted within the annular bottom well and affixed thereto.

3. A unitary portable furnace adapted to be prefabricated for shipment to the site, comprising concentric vertical cylindrical shells spaced one within the other by interposed layers of insulating material, stiffening bar rings within the inner cylindrical shell and spaced longitudinally thereof, radial bolts tying the outer and inner cylindrical shells together, holding the insulation in place and fastened to the bar rings at their inner ends to unify the structure, a bottom plate with a central opening and a depression to form an annular bottom well, a cylindrical bank of vertical tubes spaced within the inner shell and concentric therewith, return bends attached to the tubes and interconnecting them at their ends to form a continuous fluid heating coil, a concrete bottom filling the annular bottom well and embodying the bottom return bends of the coil so that the coil is solidly supported from the bottom by the concrete, a hollow sheet metal inverted cone having a large circular disc top plate, the inverted bottom end of the cone and the disc being of such size that the cone fits within the upper ends of the tubes of the coil and the disc overlaps the tubes at the top and is bolted to the upper return bends, angle iron legs welded to the outer wall of the outer shell of the furnace, extending from the top of the shell well below the bottom of the shell to support the furnace, a conical chimney affixed to the top of the angle iron legs concentric with the furnace at the top and overhanging the furnace shell to form an annular cool air opening into the cone of the chimney, and a central axial burner mounted within the annular bottom well and affixed thereto.

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