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E. R. EDWARDS
SPACE HEATER

2,518,982

Filed March 25, 1947

2 Sheets-Sheet 1

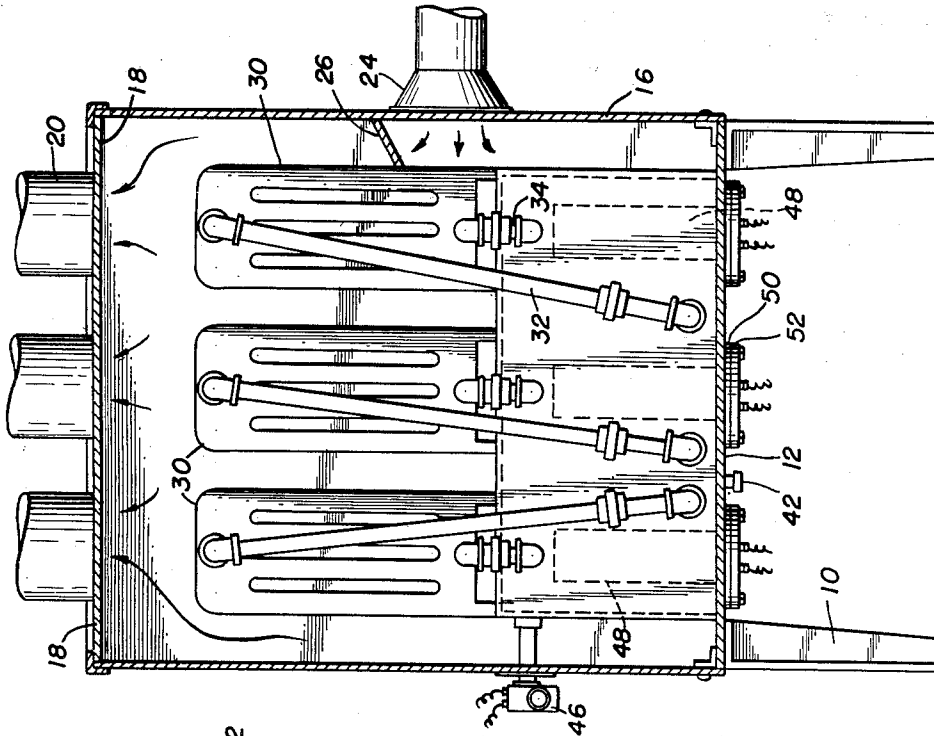


Fig. 1.

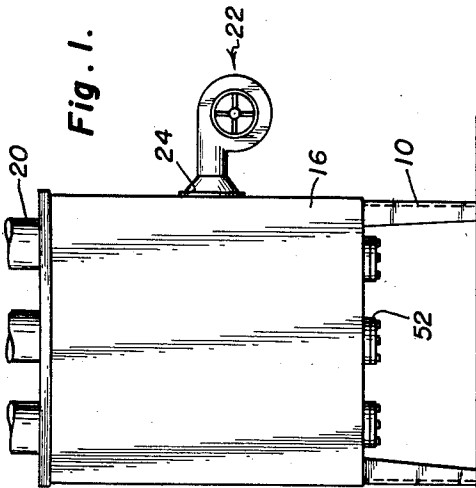


Fig. 7.

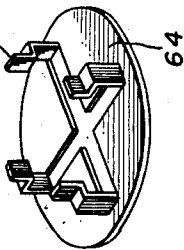
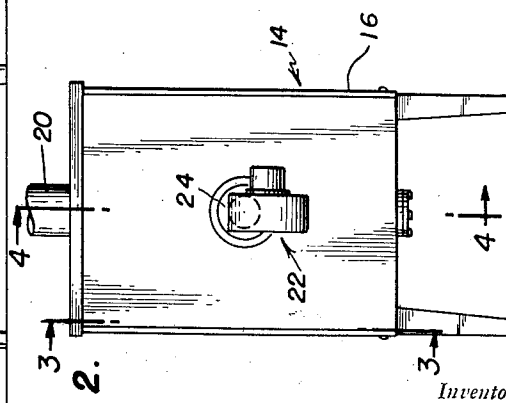


Fig. 2.



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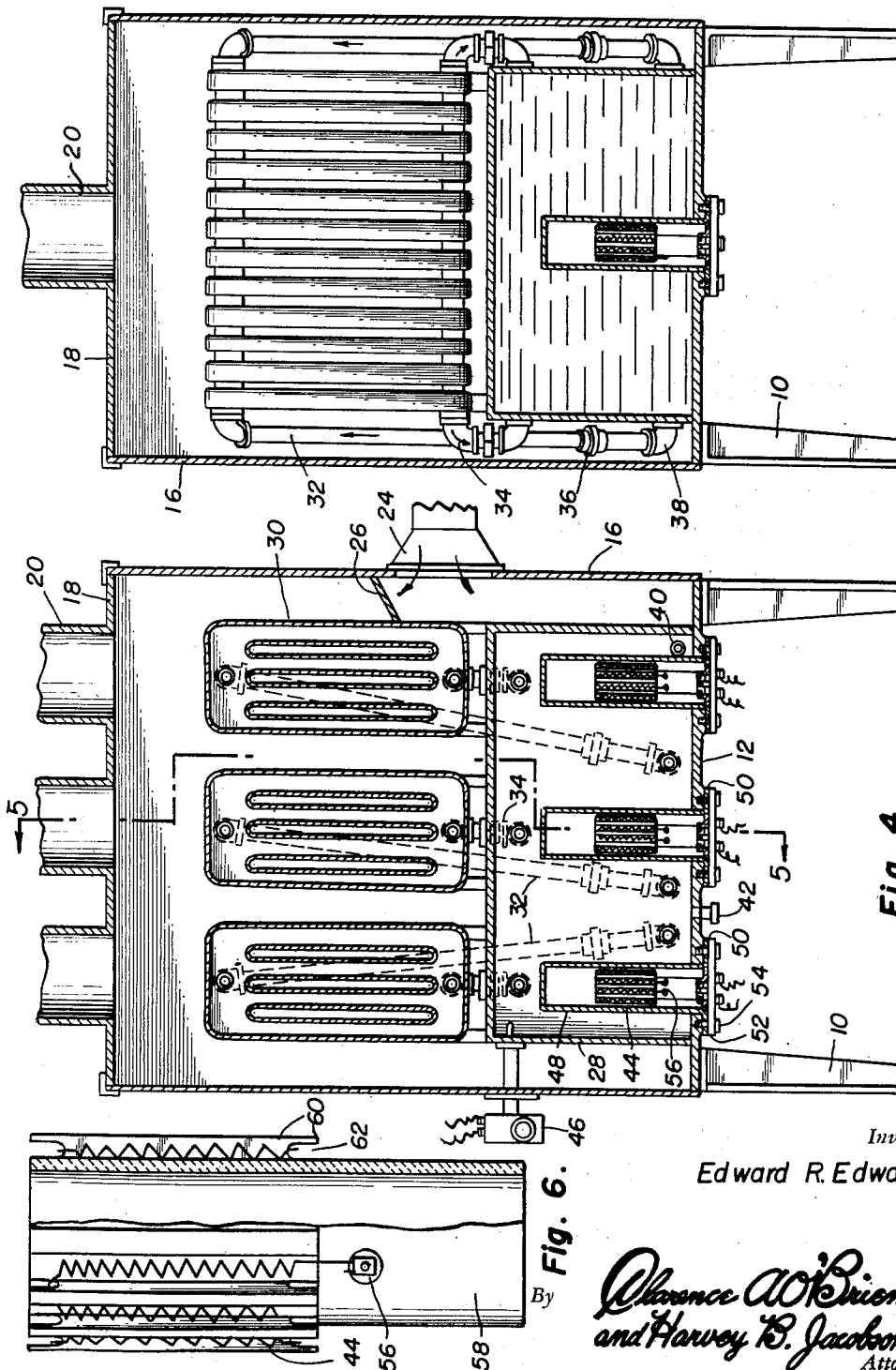


Fig. 5.

Fig. 4.

Fig. 6.

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UNITED STATES PATENT OFFICE

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SPACE HEATER

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2 Claims. (Cl. 219—39)

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This invention relates generally to space heaters, and more particular to a space heater comprising a boiler having a plurality of electric heating units enclosed in heat conductive covers, this boiler forming a closed system with a radiator, and the boiler and radiator being enclosed within a casing wherethrough air is forced.

The primary object of the invention is to provide a heating unit for the rooms of buildings and general space heating, and to generally function in the same role as an ordinary heating furnace.

Another object of this invention is to provide a space heater in which the heating elements are very conveniently located and are easily removed for replacement or repair.

Another object of this invention is to provide a space heater so designed that the connections and other portions of the closed water circulating system are easily accessible.

Another object of this invention is to provide a space heater which will be extremely economical in operation, there being very little heat lost through the air immediately surrounding the heater.

And a last object to be specifically mentioned is to provide a heater of this character which is inexpensive and practicable to manufacture, simple and convenient to install and use, adapted for automatic control, and adapted to provide for generally efficient and durable service.

With these and other objects definitely in view the invention resides in certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings which form a material part of this application, and in which:

Figure 1 is a vertical side elevational view of the assembled heater;

Figure 2 is another elevational view of this heater;

Figure 3 is a vertical sectional view of the heater, taken on the line 3—3 in Figure 2.

Figure 4 is a vertical sectional view, taken on the center line 4—4 in Figure 2;

Figure 5 is a vertical sectional view, taken on the line 5—5 in Figure 4;

Figure 6 is an enlarged detailed view of a refractory plug with an electric heating element thereon, the view being partly in elevation and partly in vertical section, to facilitate the illustration and to amplify the disclosure of this invention; and

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Figure 7 is a perspective view of the attachment base whereon the plugs, illustrated in Figure 6, are supported.

Similar characters of reference designate similar or identical parts and portions throughout the specification and throughout the several views of the drawings.

Referring now to the drawings in detail, which drawings represent one preferred embodiment of this invention, it will be noted that a plurality of legs 10 are secured to the base 12 of a casing, generally indicated by the numeral 14, and comprising side wall portions 16 and a top 18, the top 18 being apertured and provided with a plurality of pipes 20 to lead air from the heater to different rooms or areas as the case may require.

Air is drawn into this casing by an electric fan generally indicated by the reference numeral 22, connected with an inlet pipe 24 on the side wall 16 of the casing.

An obliquely disposed baffle plate 26 is secured to the side wall 16, projecting outwardly therefrom at a point slightly above said outlet 24.

A water container, hereinafter referred to simply as the boiler 28, may be formed integral with the base 12 of the casing, that is, with the base 12 comprising the base of the boiler 28, and this boiler is of a dimension smaller than the interior of the casing 14 so that an air space is provided encircling the boiler. One or more radiators 30, of substantially standard design, are secured on the top of the boiler 28, and are connected thereto by radiator inlet pipes 32 and radiator outlet pipes 34, both inlet and outlet pipes being in duplicate, that is, on each side of the radiator, in order that accelerated circulation of the water within the closed system formed by the boiler and the radiator may be obtained. These pipes are formed with coupling members 36 and standard elbows 38, all located within the casing 14 and spaced from the walls thereof, so that air drawn through the inlet circulates around said boiler, radiator and connecting pipes.

A water inlet 40 and a drain 42 are provided in the boiler, and it is proposed that this boiler will be nearly filled with water, an emergency relief valve being provided, if desired, this high level of water in the boiler being made practicable by the use of electric heating elements 44 which are capable of being accurately controlled with relation to the temperature of the water in the boiler, as well as the temperature sought to be obtained in the space heated by the heater. The device to control the temperature of the

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water in the boiler, as well as the temperature of the heated air, is represented diagrammatically at 46, it being understood that this controlling unit 46 is electrically connected with the heating elements 44 and thermostatic unit (not shown).

Secured to the base 12 of the boiler are a plurality of preferably cylindrical covers 48, these covers being closed at the top and open at the base and having flanges 50 at their bases extending outwardly at right angles to facilitate the securing of these covers, in apertures formed in the base 12, with the flanges 50 secured to the base 12 by attachment plates 52 and a plurality of stud bolts 54. Obviously, the shape of these covers 48 may vary without departure from the spirit of this invention, and the apertures in the base 12, as well as the plates 52 will necessarily be shaped to conform with the character of the covers 48.

The heating elements 44 will ordinarily be secured to terminals 56 on plugs 58 of refractory material, having radially extending flutings, or ribs 60, terminally recessed as at 62, to support the electric heating elements 44. These plugs 58 may be conveniently secured within the covers 48 by means of a plug supporting plate 64, best illustrated in Figure 7, having a spring bracket 66 of irregular shape secured to the upper face thereof and adapted to engage the lower end of the plug 58 and to space this plug a short distance above the plate 64 in order that maximum air circulation may be achieved within the covers 48, this maximum circulation being desirable in order that the heating elements 44 will have increased length of useful life. It should be carefully noted that the diameter of the plate 64 is slightly larger than the interior diameter of the cover 48 and that the thickness of the plate 64 is substantially equal to the thickness of the plate 50, so that the plate 64 and the flange plate 50 can be secured firmly within the attachment plate 52 and the base 12 of the boiler, the inside edges of the covers 48 being bevelled or slightly recessed at the base to accommodate the edges of the plate 64, as illustrated in Figures 4 and 5.

The method of operation of this device will be obvious from a consideration of the foregoing description of the mechanical details thereof but, in recapitulation, it may be noted that the boiler is capable of being filled with water to a reasonably high level, and the inlet 40 and outlet 42 will normally be closed. Electrical energy will, of course, be led to each of the heating elements 44, through the controlling member 46, and the heat engendered within the covers 48 is transmitted through these covers to the water in the boiler 28. The water, steam, or in some systems, a mixture of water and steam, circulates convectively through the boiler, radiator or radiators and the connecting pipes 32 and 34. The air drawn in by the fan through the outlet 24, and directed downwardly by the baffle 26, circu-

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lates in contact with all the heated elements within the casing 16 and is warmed thereby prior to the outlet flow of this air through the pipes 20.

Though there has been shown a particular embodiment of this invention this application is not limited to this particular embodiment, but it is desired to include in the scope of this invention the construction, combination and arrangement of parts and portions substantially as set forth in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. Heating units for use with a boiler having an aperture in a wall thereof, comprising a hollow cylindrical cover extending into the boiler through said aperture, a flange on the outer end of said cover larger than said aperture, an attachment plate secured to said wall of the boiler and holding said flange on said wall in sealed relation, a plug supporting plate secured between said cover and the attachment plate and having a spring bracket, a hollow plug of refractory material terminally engaged with said bracket and extending axially of the cover, and a heating element on said plug having terminals on said attachment plate.

2. Heating units for use with a boiler having an aperture in a wall thereof, comprising a hollow cylindrical cover extending into the boiler through said aperture, a flange on the outer end of said cover larger than said aperture, an attachment plate secured to said wall of the boiler and holding said flange on said wall in sealed relation, a plug supporting plate secured between said cover and the attachment plate and having a spring bracket, a hollow plug of refractory material terminally engaged with said bracket and extending axially of the cover, and a heating element on said plug having terminals on said attachment plate, said plug having radially extending longitudinally disposed ribs, said ribs having terminal recesses, and said heating element comprising wire having high resistance to electric current laced consecutively around said ribs and held within said recesses.

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