Oct. 11, 1955 W. A. LEBUS 2,720,201

IMMERSION HEATER BURNER HOUSING WITH FLAME ARRESTER

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Fig. 1

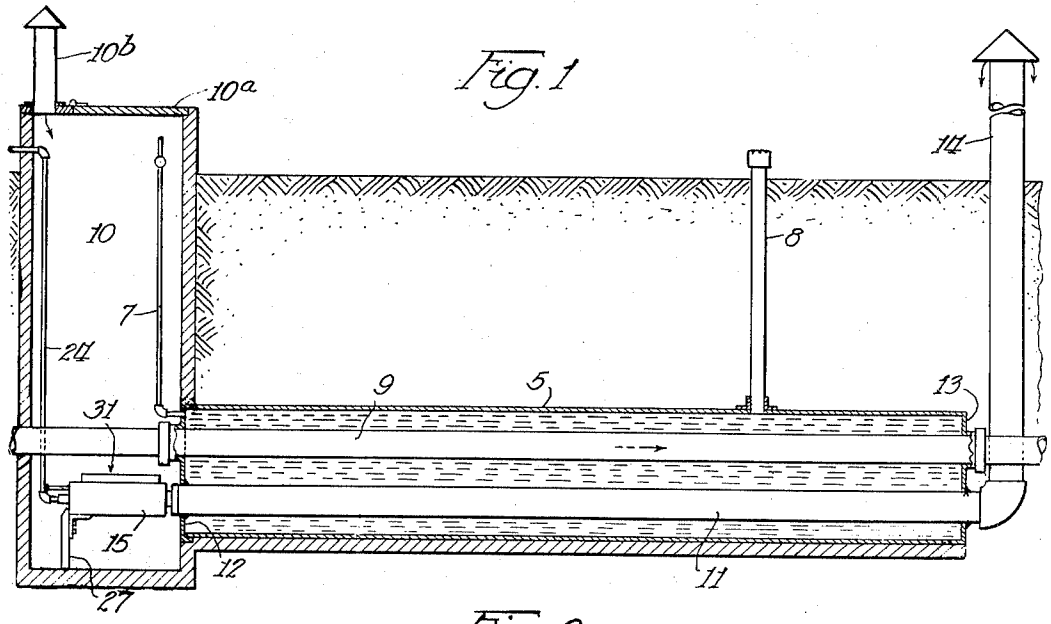
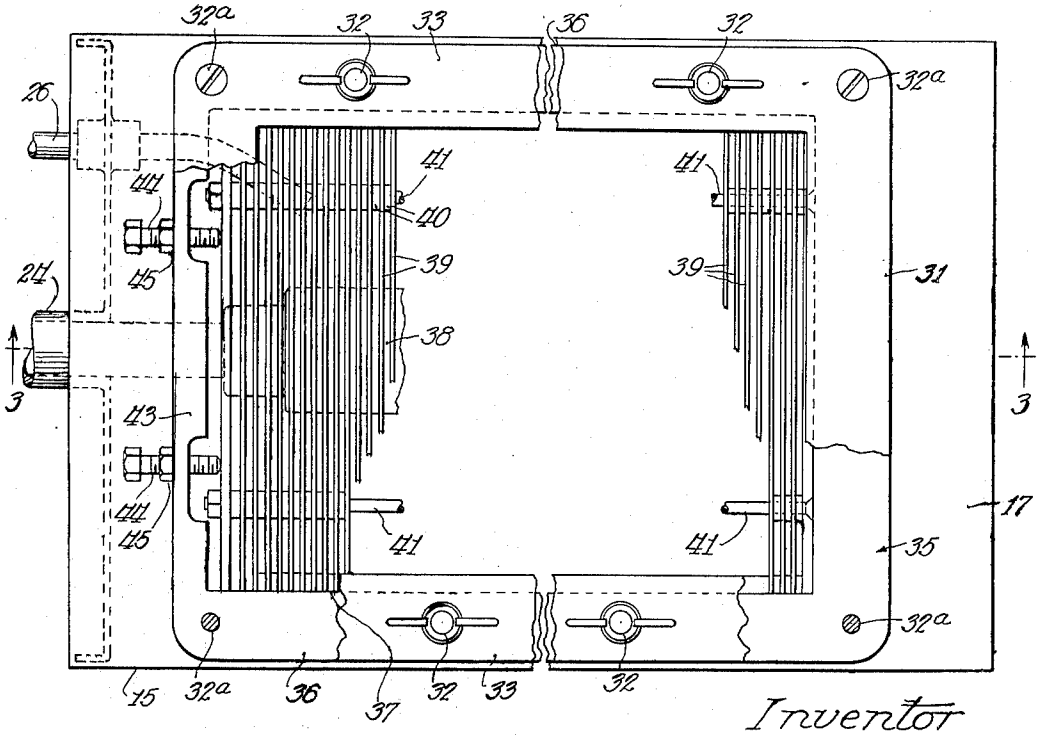


Fig. 2



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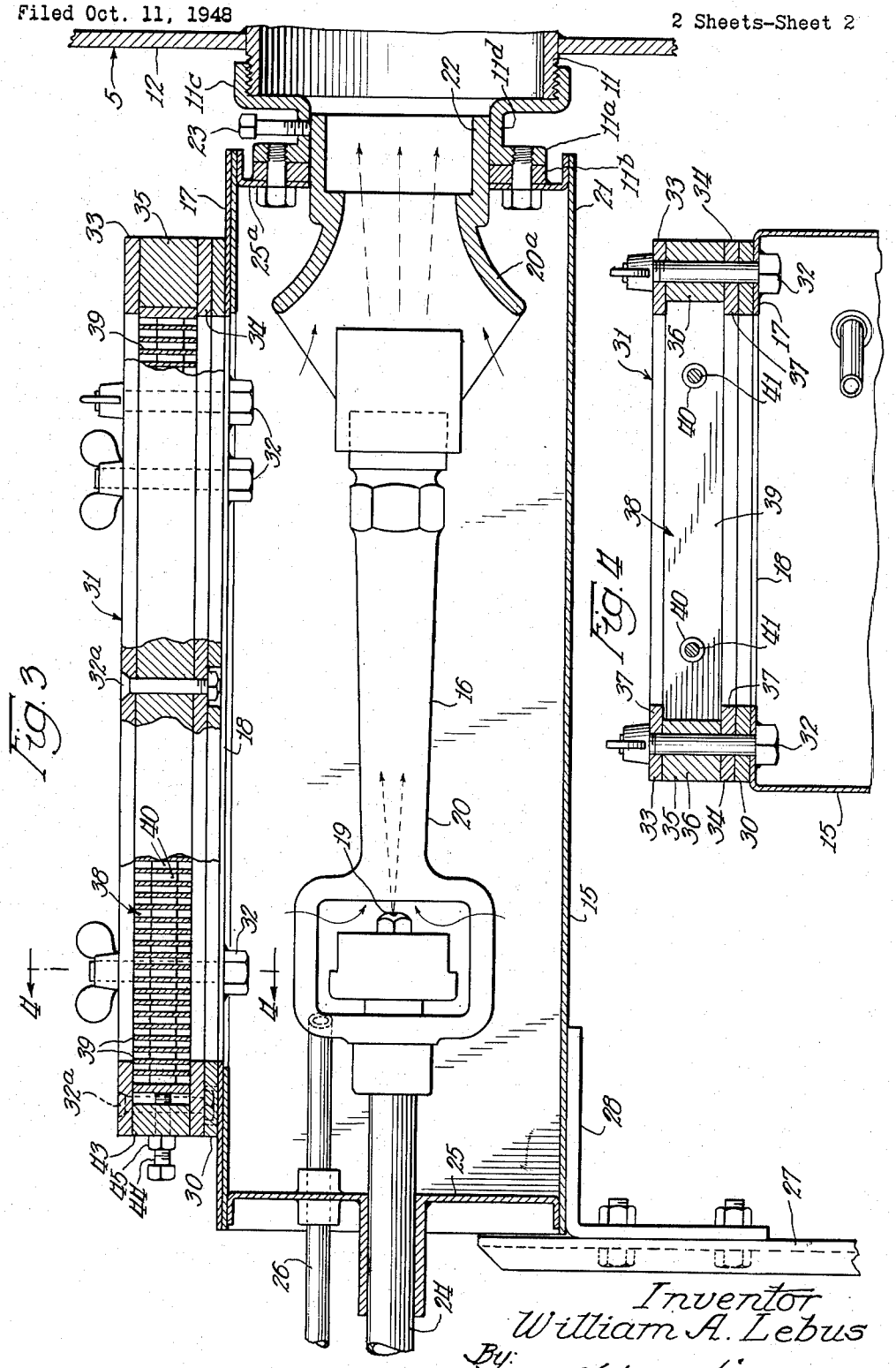


Fig. 3

Fig. 4

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IMMERSION HEATER BURNER HOUSING WITH FLAME ARRESTER

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4 Claims. (Cl. 126—85)

This invention relates to an immersion heater and more particularly it relates to an immersion heater flame arrestor structure. The invention will be described in connection with a pipe-line burner operatively connected to a combustion tube of a heater for gas pipe lines to prevent condensation comprising a flame arrestor and housing assembly for a burner operatively connected to a combustion chamber.

Immersion heaters of the type herein disclosed are placed below ground and are employed to heat a flowing fluid such as gas which is being pumped from its source to distant points. When the distance is great, several pumping stations are provided along the pipe lines to move the fluid, and inasmuch as gas is likely to become partially condensed from the cold, immersion heaters are provided along the pipe lines to heat the flowing gas.

One of the objects of this invention is the provision of a flame arrestor which admits air to the burner, but will prevent any flame from escaping.

Sometimes a leak occurs in a pipe line and the gas finds its way to the pit which is associated with the heater. One object of this invention is the provision of a flame arrestor and the burner of the heater which will prevent any flame to escape from the burner to the pit, thereby preventing an explosion of the accumulated gas in the pit.

Another object is to provide a flame arrestor of simple and novel construction for use on an immersion heater and which is highly effective for the purpose intended.

Other objects and advantages will appear in the course of this specification and with said objects and advantages in view, this invention consists in the several novel features hereinafter fully set forth and more particularly defined in the appended claims.

The invention is clearly illustrated in the drawings accompanying this specification, in which:

Fig. 1 is a central vertical longitudinal section through an immersion heater embodying a simple form of the present invention.

Fig. 2 is a detail enlarged plan of the flame arrestor partly broken away.

Fig. 3 is a central vertical longitudinal section taken on the line 3—3 of Fig. 2; and

Fig. 4 is a vertical cross section taken on the line 4—4 of Fig. 3.

Referring to said drawings which are merely illustrative of a simple form of the present invention, the reference character 5 designates an elongated tank located below the surface of the ground, said tank contains water heated by a burner 6. Evaporated water may be replenished through a filler pipe 7, and a vent tube 8 leads from the tank to a suitable point above the surface of the ground above the tank to release pressure in the tank.

One or more pipe lines 9 lead through the tank from the source of the fluid to the destination thereof and said pipe lines are surrounded by the water in the tank.

At one end of the tank is a pit 10 which leads up to or above the surface of the ground above the tank and usually a ladder (not shown) is provided in the pit for

an attendant to reach the bottom of the pit and to climb up therefrom. A lid 10*a* is provided for the open top of the pit, and an air inlet pipe 10*b* extends up from the top wall of the pit to admit air to the pit and burner. The pipe lines are usually placed above the center of the tank and extend out through the pit. Below the pipe lines is a burner tube 11 which may extend from the end wall 12 of the tank through the other end wall 13, and to the protruding end of the burner tube is connected a chimney 14 which leads up to or above the surface of the ground above the tank and conducts the products of combustion away from the burner tube. The burner tube is shown as mounted on the end wall 25*a* by a disc 11*a* bolted to the wall 25*a* and an interposed centrally apertured disc 11*b* welded to the wall. The disc 11*a* is formed with an axially disposed internally threaded collar 11*c* into which one end of the burner tube 11 is screwed. Leakproof joints are also provided at the other end of the burner tube, and also between the pipe lines and the end walls of the tank.

Extending into the pit from the wall 12, in alignment with the burner tube 11, is a receptacle 15 in which is contained a burner 16 of common and well known construction, also disposed in coaxial alignment with the burner tube 11. In the top wall 17 of the receptacle is an opening 18 through which air is admitted to the receptacle. The burner tip 19 is located at one end of the body 20 of the burner, which body has an air inlet opening adjacent the tip, and a second air inlet opening is provided in a flaring hollow body 20*a* which is formed with a nipple 22 on one end that extends into a sleeve-like member 11*d* formed between the disc 11*a* and the threaded collar 11*c*. Set screws 23 are threaded in the member 11*d* and bear against the nipple 22 to prevent any endwise movement thereof. A supply pipe 24 for the fuel for the burner leads from a suitable source and extends through the wall 25 of the receptacle and is secured in the burner body and communicates with the tip 19. If desired, a pilot light tube 26 leading from a suitable source may be provided for igniting the fuel issuing from the tip.

The outer end of the receptacle 15 may be supported as by posts, one of which is seen at 27 and an angle iron bracket 28 secured thereto.

The opening 18 in the top wall 17 of the receptacle is here shown as of rectangular form and surrounding said opening is a flange 30 of steel, brass or other suitable material, and resting upon said flange is a flame arrestor 31 which is removably secured to said flange and to the top wall of the box by bolts 32 and bolts 32*a*.

The heads of the bolts 32 are welded to the top wall of the receptacle and extend up through holes in the frame members of the flame arrestor and have wing nuts on their upper threaded ends which bear against the upper frame member and secure the flame arrestor to the receptacle. The bolts 32*a* extend down through the holes in the frame members of the flame arrestor and have nuts on their lower threaded ends, which are let into holes formed in the flange 30. The flame arrestor may be removed as a whole by first unscrewing the wing nuts from the bolts 32, the bolts 32*a* and nuts thereon functioning to hold the members of the flame arrestor together.

The flame arrestor has top and bottom rectangular frame members 33, 34 between which is an intermediate frame member 35, the bars 36 of which are narrower than the bars 37 of the top and bottom frame members.

Resting on the protruding edge portions of the bars 37 of the bottom frame member is a grid assembly 38 which may be composed of parallel spaced narrow grid plates 39 which extend crosswise of the frame members and are confined between the protruding edge portions of the bars 33, 34. The grid plates may be spaced apart by washers 40

or teats and may be tied together by tie rods **41** that extends through the grid plate **39** and through the washers **40** and have nuts on their ends by which the grid plates of the grid assembly are held tightly against the washers, whereby they are suitably spaced apart to permit the passage of air in one direction and to prevent the passage of a flame in the opposite direction in case of a back fire.

Threadedly mounted in one end bar **43** of the intermediate frame member **35** are set screws **44** which are screwed up tightly against one end of the grid assembly thereby clamping it tightly against the opposite frame bar of the intermediate frame member, and lock nuts **45** are provided on the set screws for locking them in adjusted position.

In operation the heat from the burning fuel heats the burner tube **11** which heats the water in the tank and the heated water heats the fluid flowing through the pipe lines in the tank.

In the event that gas accumulates in the pit, it cannot become ignited by any back fire from the burner receptacle because of the flame arrestor which prevents any flame from escaping from the receptacle.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form construction, arrangement and combination of parts herein shown and described or uses mentioned.

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

1. A flame arrester and burner including a housing, burner elements in said housing, a flame arrester supported on said housing and surrounding an air inlet opening therein, said air inlet opening admitting air into said housing through said flame arrester, means surrounding said opening to support said flame arrester in detachable arrangement at said opening, said flame arrester including a plurality of relatively spaced grid plates and tie rods connecting said grid plates in such spaced arrangement, a frame for said grid plates supported on the supporting means surrounding said air inlet opening and comprising, in interdependent assembly, independent top and bottom frame members and an intermediate frame member disposed between said top and bottom frame members and by which said grid plates are mounted within said frame, and means carried by said intermediate frame member to secure the grid plates in the frame.

2. A flame arrester and burner as claimed in claim 1, wherein the grid plates are removably positioned within the confines of the top and bottom frame members thereby permitting access to said burner housing when said flame arrester is disassociated from said frame members.

3. A flame arrester and burner as claimed in claim 1, wherein the means carried by said intermediate frame member for positively positioning the grid plates within the confines of said frame members includes plural means.

4. A flame arrester and burner as claimed in claim 1, wherein the housing includes top, bottom, side and end walls, said flame arrester being associated with one of said walls.

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