Sept. 1, 1925. 1,551,788

A. W. BENSON

OIL BURNING CAMP STOVE

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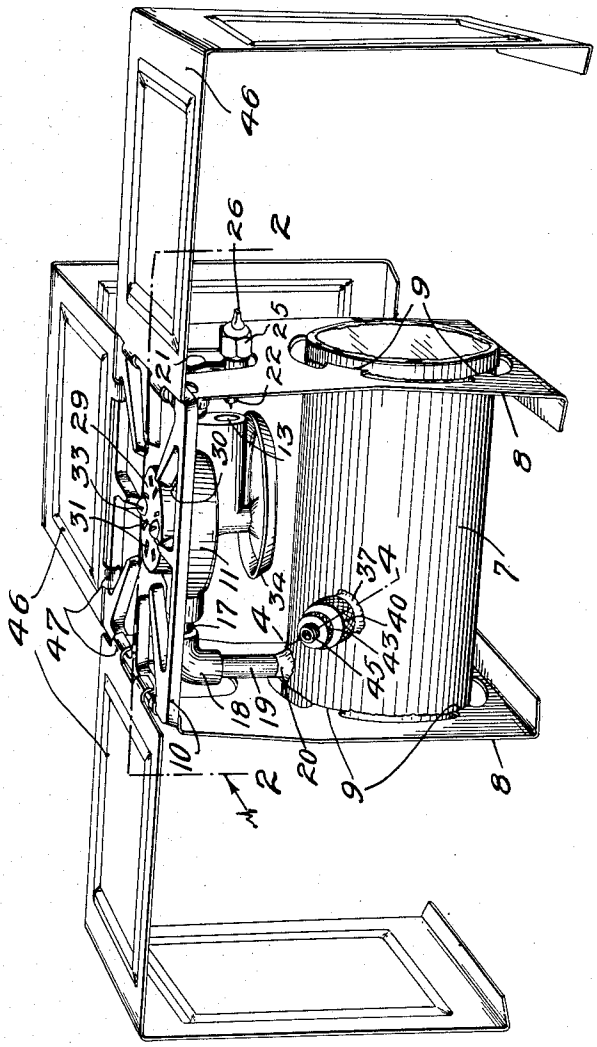
Fig. 1



Inventor
Adolphus W. Benson

By his Attorneys
Merchant & Gilmore

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Fig. 2

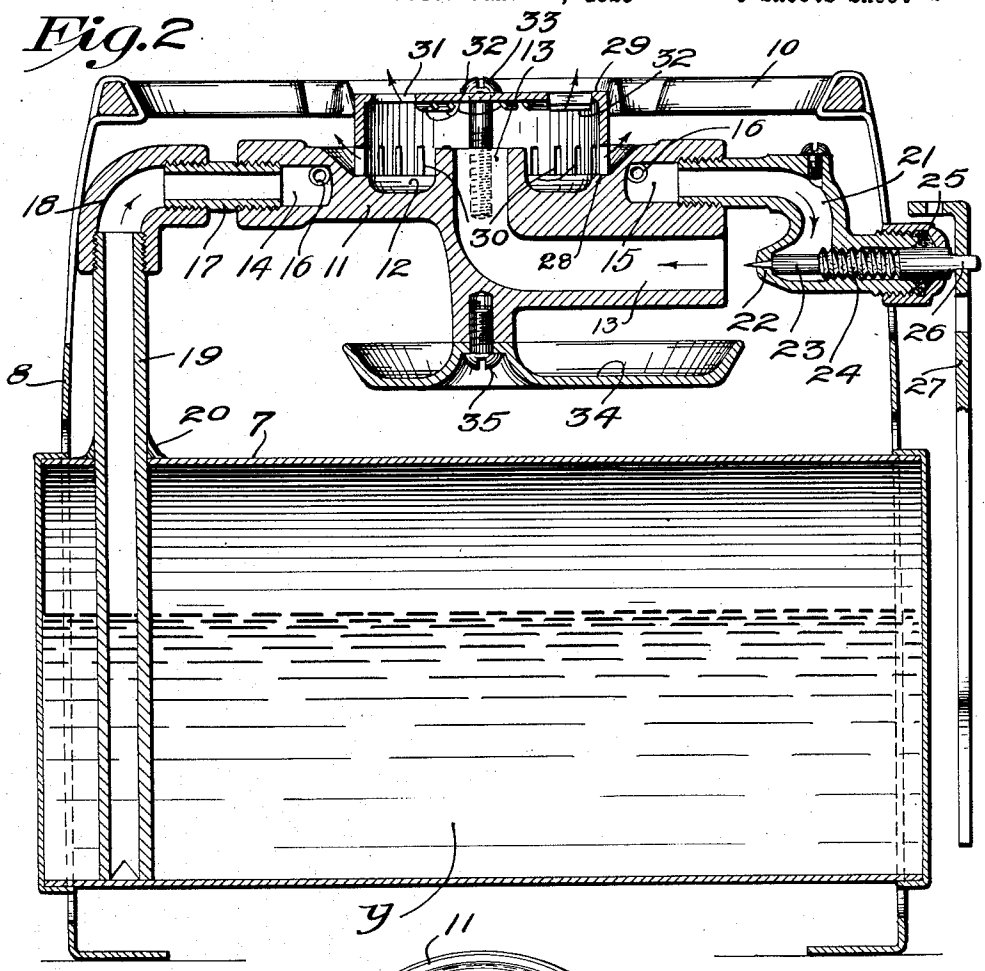

Fig. 3

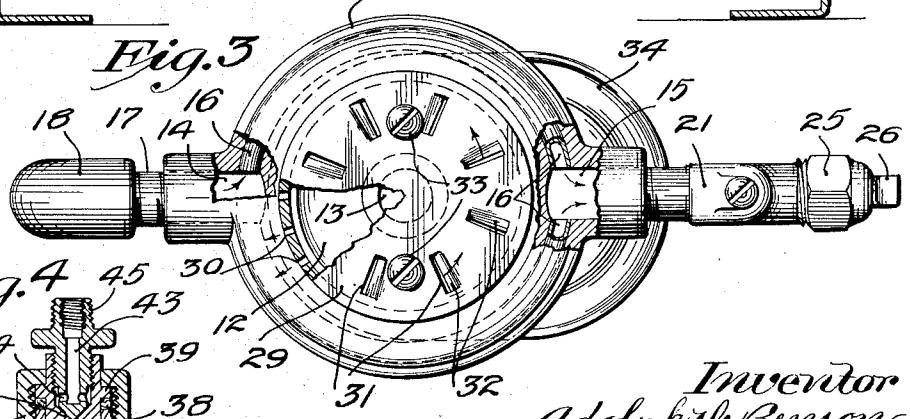

Fig. 4

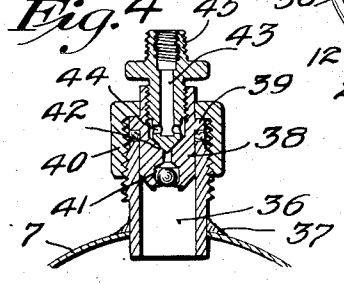

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Fig. 5

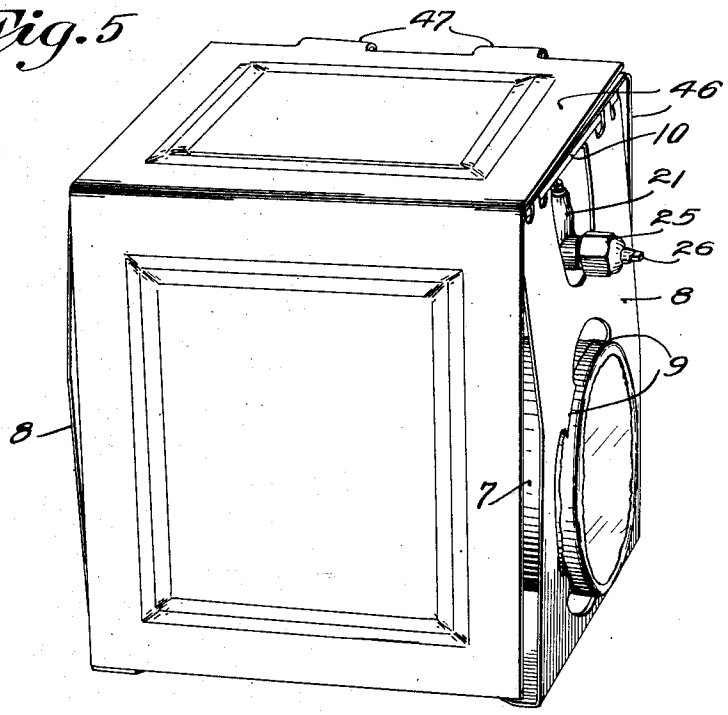
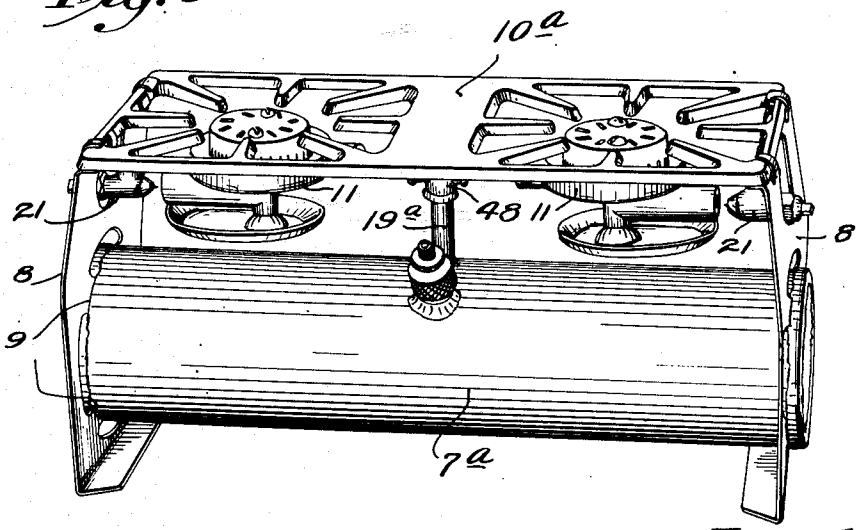


Fig. 6



Inventor
Adolph W. Benson

By his Attorneys
Merchant & Kilgore

Patented Sept. 1, 1925. 1,551,788

UNITED STATES PATENT OFFICE.

ADOLPH W. BENSON, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO EVINRUDE MOTOR COMPANY, A CORPORATION OF WISCONSIN.

OIL-BURNING CAMP STOVE.

Application filed January 22, 1923. Serial No. 614,075.

To all whom it may concern:

Be it known that I, ADOLPH W. BENSON, citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Oil-Burning Camp Stoves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that type of portable oil-burning stove generally designated as camp stoves and which are adapted to be folded or closed up within small space and to be conveniently carried in automobiles and various other vehicles, and, generally stated, the invention consists of the novel construction, devices and combinations of devices hereinafter described and defined in the claims.

The accompanying drawings, wherein like characters indicate like parts throughout the several views, illustrate the commercial embodiments of the invention in stoves having both single and double burners.

Referring to the drawings:

Fig. 1 is a perspective showing the single burner camp stove set up for use;

Fig. 2 is an enlarged vertical section taken on the line 2—2 of Fig. 1, the combined case and shield plates being removed;

Fig. 3 is a plan view, with some parts broken away, showing the burner fixture with other parts of the stove removed;

Fig. 4 is a detail in section on the line 4—4 of Fig. 1, showing the air-charging tube and valve mechanism;

Fig. 5 is a perspective showing the single burner stove closed up in condition for storage or carrying; and

Fig. 6 is a perspective showing the double or two-part burner camp stove.

The single burner stove illustrated in Figs. 1 to 5, inclusive, will first be described.

Gasoline will preferably be used as the gas or vapor-producing fuel, and this will be contained in an air-tight tank 7 preferably of cylindrical form and horizontally disposed. Moreover, this tank 7 is preferably made of quite heavy steel, the heads of which tank are secured to the cylindrical body thereof by welded joints. This tank will be supported slightly above, but free from the ground or floor, by laterally spaced frame members preferably in the form of sheet metal plates 8 having openings through which the ends of the tank are passed but to which plates the tank is rigidly secured at 9, preferably by welded joints. The tank is thus not only itself supported but forms a rigid tie and brace between the two frame plates 8.

The upper ends of the frame plates 8 are bent around and rigidly support a grid 10, preferably of cast iron. Located above the tank and just below the central portion of the grid 10 is a cast metal burner plate 11 formed in its top with a bowl 12, at the center of which rises the delivery end of a tubular air intake passage 13. The receiving portion of the air passage 13 is horizontally extended and opens at one side of the plate 11. At diametrically opposite points, the burner plate 11 is formed with outwardly opening ports 14 and 15 and these ports are connected by ports afforded by approximately semi-circular metal tubes 16 that extend around the bowl 12 and are cast into said plate 11. A short pipe section 17 is screwed into the port 14 and into one end of an elbow 18 and the other end of said elbow is screwed onto the upper end of a pipe section 19, the lower end of which extends through the top of the tank 7 and is rigidly secured thereto, preferably by a welded joint 20. By the pipe elements 17, 18 and 19, the burner plate 11 is rigidly supported in the position above noted. A combined vapor tube and valve seat 21 is screwed into the port 15 and is rigidly supported from the burner plate 11. This tube 21 is formed with a discharge nozzle 22 located just outward of but in axial alignment with the receiving end of the air intake passage 13 and the discharge passage of this nozzle is arranged to be entirely closed or to be opened more or less by a needle valve 23 having threads 24 that engage internal threads of the tube 21. The outer end of the needle valve 23 works through a stuffing box 25 on the outer end of the tube 21 and its projecting end is formed with an angular shank 26 that is adapted to be engaged by any suitable form of wrench but preferably by a special wrench, such as the wrench 27 shown in Fig. 2.

The bowl 12, above its bottom and below

its top, is formed with an annular ledge 28 and on this ledge is seated the lower edge of an inverted cup-shaped cap 29. The lower edge of the rim of this cap 29 is formed with circumferentially spaced slots 30 that afford lower vapor passages, and the top plate of said cap is provided with circumferentially spaced vapor discharge passages 31 that are formed by downwardly pressing or otherwise providing oblique deflecting lips or flanges 32. These deflecting lips 32 are important for the reason that they cause the vapor discharged therethrough to take a whirling course around the axis of the burner cap, as they are discharged through the top plate thereof, but this action will be further considered later on. To rigidly but detachably secure the cap 29 on the ledge 28 and to the burner plate 11, machine screws 33 are passed through the top thereof and screwed into said plate 11 on opposite sides of the centrally located upper extremity of the air intake passage 13.

The numeral 34 indicates a primer cup, which, as shown, by a screw 35, is rigidly but detachably secured to a lug on the bottom of the burner plate 11 and below the air intake passage 13. This priming cup is adapted to contain enough gasoline to start the initial generating action when the cold stove is to be put into action.

The tank 7 is provided with a filler or charging tube 36 extended through one side top portion thereof and rigidly connected thereto preferably by a welded joint 37. The numeral 38 indicates a tubular valve seat that is telescoped into the filler tube 36 and has an annular flange 39 clamped onto said tube 36 by a screw-threaded gland 40. The tubular valve seat 38, at its lower end, has an inwardly opening check valve 41 and outward thereof is formed with a valve seat 42 that is normally closed by the conical end of a hollow needle valve 43. This needle valve 43 has threaded engagement with the interior of the valve seat 38 and is formed with radial air passages 44. The outer end of the tubular needle valve 43 is threaded at 45 so that an air-charging hose may be coupled thereto.

When the tank is to be charged with gasoline *y*, the gland 40 and tubular valve seat 38 will be removed from the filler tube 36. When the tank is to be charged with air under pressure, the air-charging hose will first be coupled to the tubular needle valve 43 and then the said valve will be unscrewed so as to permit the air to be forced into the tank and, of course, when the tank has been charged with the proper air pressure, the needle valve 43 will be again closed before the air tube is disconnected therefrom.

It will be noted that the stove so far described is an approximately rectangular structure, entirely open from the bottom and at two sides. The opening at the bottom is important because any overflowing or dripping gasoline may run directly onto the ground and will not be caught and held by the base structure of the stove, and this eliminates dangers from explosion in the use of the stove. As highly important features, there is provided, in connection with the stove or as a part thereof, a plurality of rectangular or approximately L-shaped extension plates 46 that are of such width and other dimensions that they may be applied, as shown in Fig. 1, to form leaf extensions to the grid or may be packed against the sides of the stove, as shown in Fig. 5, when the stove is to be stored, shipped or carried. At the free edges of the horizontal portions of the extension plates 46 are hook-like lips 47 that are detachably engageable with the rim bars of the grid 10 to hold the said extension plates positioned as shown in Fig. 1. Obviously, in the arrangement of the extension plates shown in Fig. 1, the grid is formed with three extended leaves that are adapted to support cooking utensils, dishes and the like, thus very greatly increasing the utility of the stove. Moreover, the vertical portions of the plates 46 may be arranged as wind shields to prevent the wind from interfering with the proper burning of the stove. Fig. 1 illustrates the use of three extension plates, but the number thereof may, of course, be varied. For ordinary purposes, two will be found sufficient, and when but two such plates are provided and the stove is to be packed or carried, the two extension plates will be placed closely against the normally open sides of the stove, as shown in Fig. 5, thereby bringing all of the parts of the stove within a rectangular arrangement that is only approximately the dimensions of the stove itself.

The stove illustrated in Fig. 6 is like that described, except as to dimensions and except for the further important fact that two burners are here employed. Each burner is of the construction already described, but in this arrangement, the pipe sections 17, instead of being connected to the elbow 18, are connected to a T-coupling 48, which, in turn, is connected by a pipe 19^a to the top of a tank 7^a. In this arrangement also, the grid 10^a is a duplex structure and, hence, approximately twice as long as the grid 10. Moreover, the tank 7^a is approximately twice the length of the tank 7. The general features of construction of both of the burners described are substantially the same.

When the space in the tank 7, above the gasoline, is charged with air under pressure, the gasoline will be forced up through the pipes 19, 18 and 17 and will fill the ports 14 and 15 and the circular tubes 16 and will run more or less into the tube 21, depend-

ing upon the amount of air caged in the latter. When the burner plate 11 is made hot, either by priming or by the continued action of the burner, the gasoline in the ports 14 and 15 and tubes 16 will be converted into vapor form, and when the needle valve 22 is opened, this hydro-carbon vapor under pressure will be blown into the receiving end of the air tube 13 and commingled with the air that is thereby forcibly blown through said air tube. Thus, a thorough commingling of the hydro-carbon vapor and air is rapidly accomplished within said passage 13 and will be further continued as the commingled air and vapor is dashed against the top of the cap 29 and is deflected therefrom. Numerous streams of carbureted air will be ejected through the burner passages 30 and 31 and the combustion will take place just outside of said passages. The numerous flames from the passages 30 will be directed outward and upward from the sides of the burner cap 29, but the most intense combustion is produced by the whirling action of the vapor set up by its discharge through the oblique upper passages 31. The intensity of the combustion may be regulated at will by adjustments of the needle valve 23.

It is further important to note that the inner walls of the bowl 12, immediately outward of the passages 30, flare or converge upwardly and outwardly and that the metal tubes 16, which are cast into the plate 11 in the process of casting the same, are located very close to the said converging surfaces. With this arrangement, a multiplicity of small flames from the passages 30 will be deflected outwardly and upwardly through the grid and will almost directly apply heat to the closely adjacent tubes 16. This not only gives the desired spread of the flame through the grid, but insures heating of the gasoline or hydro-carbon fuel sufficiently to vaporize the same while it is passing from the port 14 to the port 15 on its way to the nozzle 22. It may be further noted that the feed-controlling needle valve 23 has a reduced sharp conical point that projects completely through the nozzle and that it has a shoulder at the base of said tip, (see particularly Fig. 2). The reduced conical end of said valve keeps the small discharge passage of the nozzle always cleaned and the valve, when closed, will be doubly seated by the cone and its shoulder.

The wrench 27 has perforations in its body portion and has a laterally bent perforated end, which adapts it to be used on the valve shank 26 in any of several positions. When the burner is in action, the valve and connected parts will get quite hot, but the wrench need not be left attached to the valve but may be applied at will and, hence, kept cool.

The burner fixture, it will be noted, is supported from the tank independently of the end brackets or plates 8 and the outer end of the vapor tube 21 is projected through the adjacent end bracket or plate so that the wrench may be engaged with the valve shank 26 beyond the exterior of the said bracket or plate.

In actual practice, it has been found that a very intense combustion can be produced with the above described burner, even in a small stove.

In this stove, all of the vital parts, such as the fuel tank, burner and fuel-conducting connections are permanently fixed or connected as a single unit so that these parts cannot accidentally become disconnected or out of adjustment. Even filling of the tank does not require the tank to be removed from the stove and, in fact, it is so incorporated in the stove that it cannot be removed. Moreover, the stove is always ready for use by the simplest possible kind of manipulation. Only the so-called extension plates are separable from the stove proper and these, by their special design, are made useful, both when the stove is in action or when it is packed or out of use.

What I claim is:

1. A camp stove comprising the combination with a tank, of two end frames apertured to receive the ends of said tank and respectively connected rigidly with opposite end portions thereof, and a burner connected with said tank and supported thereabove, said end frames having sufficient width to receive the ends of said tank and also to render said tank and the two end frames a stable self supporting unit.

2. A camp stove comprising laterally spaced end frames, a tank rigidly connected to and spacing said end frames, a grid supported by the upper ends of said end frames, and a vapor generating burner connected to and receiving fluid fuel from said tank and supported above said tank but below said grid, and an L-shaped extension plate operative as an extension leaf for said grid and as a plate to close an open side thereof.

3. A camp stove comprising laterally spaced end frames, a tank rigidly connected to and spacing said end frames, a grip supported by the upper ends of said end frames, and a vapor generating burner connected to and receiving fluid fuel from said tank and supported above said tank but below said grid, and a plurality of L-shaped extension plates operative as extension leaves to said grid and to enclose the sides and top of said stove.

4. A camp stove comprising laterally spaced end frames, a tank rigidly connected to and spacing said end frames, a grid supported by the upper ends of said end frames, and a vapor generating burner connected to and receiving fluid fuel from said tank and

supported above said tank but below said grid, and a plurality of L-shaped extension plates operative as extension leaves to said grid and to enclose the sides and top of said stove, said plates having hook-like terminal lips adjacent a normally horizontal portion adapted for detachable engagement with the edges of said grid.

5. A stove comprising a horizontally disposed tank and a pair of end frames connected with portions of said tank adjacent its ends to comprise a stable unit therewith, each of said end frames being apertured to receive an end portion of the tank and being connected with the tank at a plurality of peripherally spaced points whereby said unit is braced against torsional strains.

6. A stove comprising a horizontally disposed tank and a pair of end frames connected with peripheral portions of said tank adjacent its ends to comprise a stable unit therewith, and a substantially horizontal grid supported on said end frames in vertically spaced relation to said tank.

7. In a device of the character described, the combination with a stove frame comprising end frame members and a tank rigidly connecting and spacing said members, of a burner and valve unit wholly supported from said tank and protected by said members while out of contact therewith, whereby to avoid transmitting to said tank any movement of said members with reference thereto.

8. In a device of the character described, the combination with a stove frame comprising end frame members and a tank rigidly connecting and spacing said members, of a grid mounted on said members in vertically spaced relation to said tank, and a valve and burner unit having a pipe connecting it with and supporting it wholly from said tank out of contact with said members and immediately beneath said grid whereby said unit is protected by said members and grid and is rendered incapable of transmitting to said tank any ordinary movement of said frame or grid relative to the tank.

9. A camp stove comprising independent spaced end frames and a pressure tank rigidly connecting and spacing said end frames and provided with a pressure supply fitting and grid supported upon said end frames in spaced relation above said tank, and a vapor generating burner and valve unit provided with a supply pipe connecting it with said tank and wholly supporting it therefrom in spaced relation between said tank and said grid and in a position to heat said grid without materially heating said tank.

10. A camp stove comprising horizontally disposed tank and end frames rigidly connected with portions of said tank adjacent its ends, each of said frames comprising a piece of sheet metal having an aperture large enough to receive the end of said tank and having centripetally extending tongues at intervals projecting from the margin of said aperture into engagement with the outer periphery of said tank.

11. In a device of the character described, the combination with a pair of spaced end frames having aligned apertures, of a tank of substantially uniform cross section receivable in said apertures, each of said frames being connected with said tank at spaced intervals about its periphery, together with a burner above said tank and in communication therewith.

12. In a device of the character described, the combination with a tank of sheet metal end frames apertured to receive spaced portions of said tank and welded to said tank at a plurality of points about the periphery thereof to comprise a rigid unitary structure therewith.

13. In a device of the character described, the combination with a horizontally disposed tank of substantially uniform cross section throughout its length, of sheet metal plates disposed substantially parallel to each other adjacent the ends of said tank and provided with apertures adapted to receive said ends, the margins of said apertures being provided with centripetally extending tongues extending into contact with the periphery of said tank and welded thereto at a plurality of spaced points about said periphery whereby to comprise a rigid unitary structure therewith.

14. The combination with a stove of substantially rectangular prismatic outline having openings at its sides, of a pair of plates of L-shaped form each including two surfaces at right angles, corresponding surfaces of said plates being adapted substantially to conform to the outline of said stove in plan and the other surfaces of said plates being adapted respectively to correspond to the opposite sides of said stove whereby to close said openings when fitted in nested relation to said stove.

15. The combination with a stove of substantially rectangular prismatic outline having openings at its sides, of a pair of plates of L-shaped form each including two surfaces adapted substantially to conform to the outline of said stove in plan and the other surfaces of said plates being adapted respectively to correspond to the opposite sides of said stove whereby to close said openings when fitted in nested relation to said stove, one of said plates being formed for interlocking engagement with said stove to comprise extension of the surface thereof.

16. The combination with a stove comprising substantially rectangular end frames, a grid portion having openings therein, and means spacing said end frames, of L-shaped

plates each adapted to fit about two adjacent side margins of said end frames to enclose the space therebetween.

17. The combination with a stove comprising substantially rectangular end frames, a grid portion having openings therein, means spacing said end frames, of L-shaped plates each adapted to fit about two adjacent side margins of said end frames to enclose the space therebetween, one of said plates having fingers adapted to engage said grid portion when a part of said last mentioned plate is substantially horizontal and another part of said last mentioned plate is substantially vertical in spaced relation to said stove.

18. In a device of the character described, the combination with a fuel tank, frame elements connected with said fuel tank, and a grid supported by said elements, of a valve and burner unit wholly supported from said tank within said frame elements and in operative relation beneath said grid whereby to be protected from blows by said frame elements and grid while out of contact therewith so that movement of said frame elements and grid relative to said tank will not affect the position of said unit with reference to the tank.

In testimony whereof I affix my signature.

ADOLPH W. BENSON.