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LaForge

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[54] **PORTABLE STOVE ASSEMBLY**

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[51] **Int. Cl.**[4] **F41F 9/00**

[52] **U.S. Cl.** **126/44**; 126/38; 431/344; 222/401

[58] **Field of Search** 126/38, 42, 44, 59.5, 126/40; 431/344; 222/209, 400.5, 401, 3; 137/209

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[57] **ABSTRACT**

A portable stove assembly comprising a support member having a side wall which has at least one opening, a stove for burning liquid fuel which is located within the support member and which includes a fuel reservoir, and an air pressure assembly for pressurizing the fuel reservoir of the stove. The stove includes an inlet fixture for a closure cap and an air pressure assembly includes and elongated connecting tube with a cap at one end for engaging the inlet fixture on the stove and a gas fixture at the opposite end for receiving a portable air pump. The connecting tube is configured to extend through the opening of the support member when the cap is applied to the inlet fixture so that the gas fixture is located outside of the support member.

8 Claims, 6 Drawing Figures

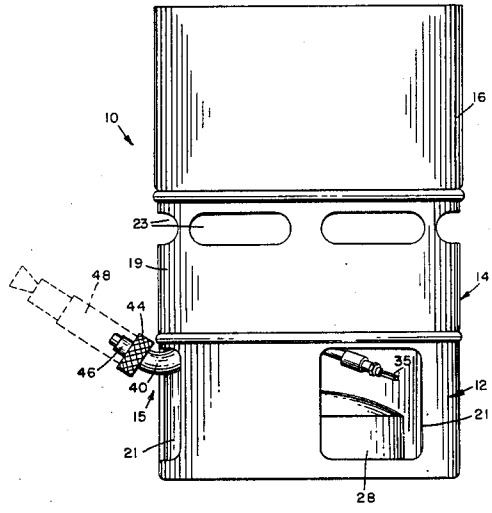

FIG. 4

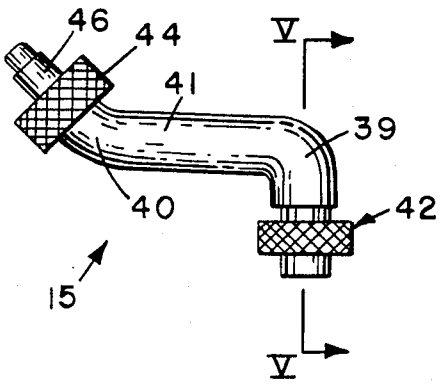

FIG. 5

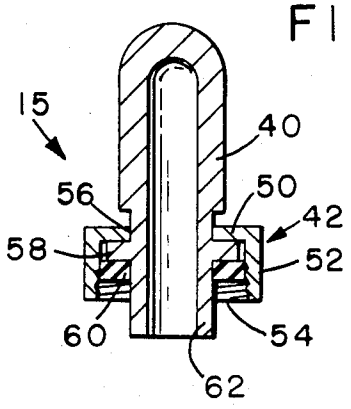

FIG. 1

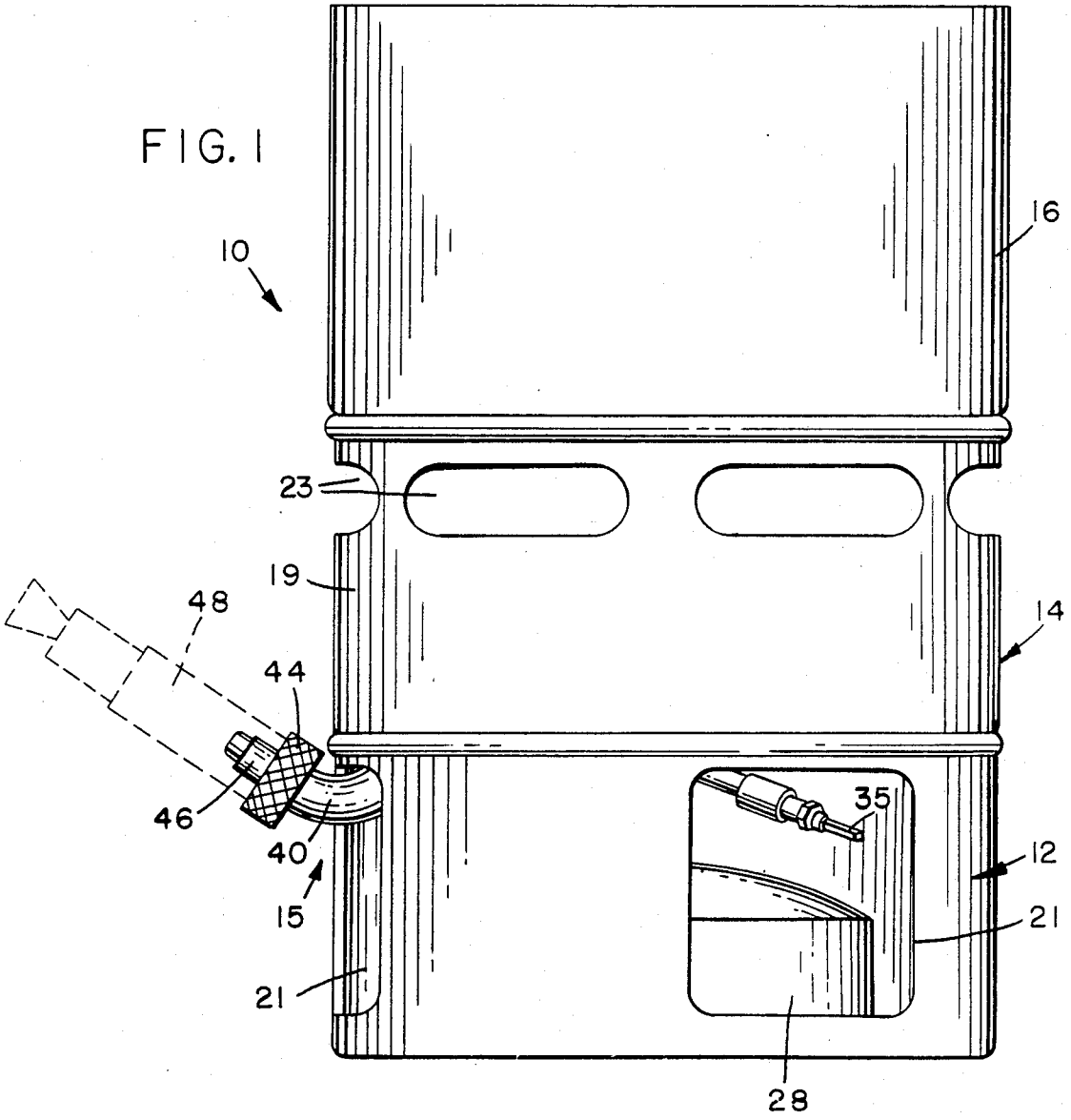

FIG. 2

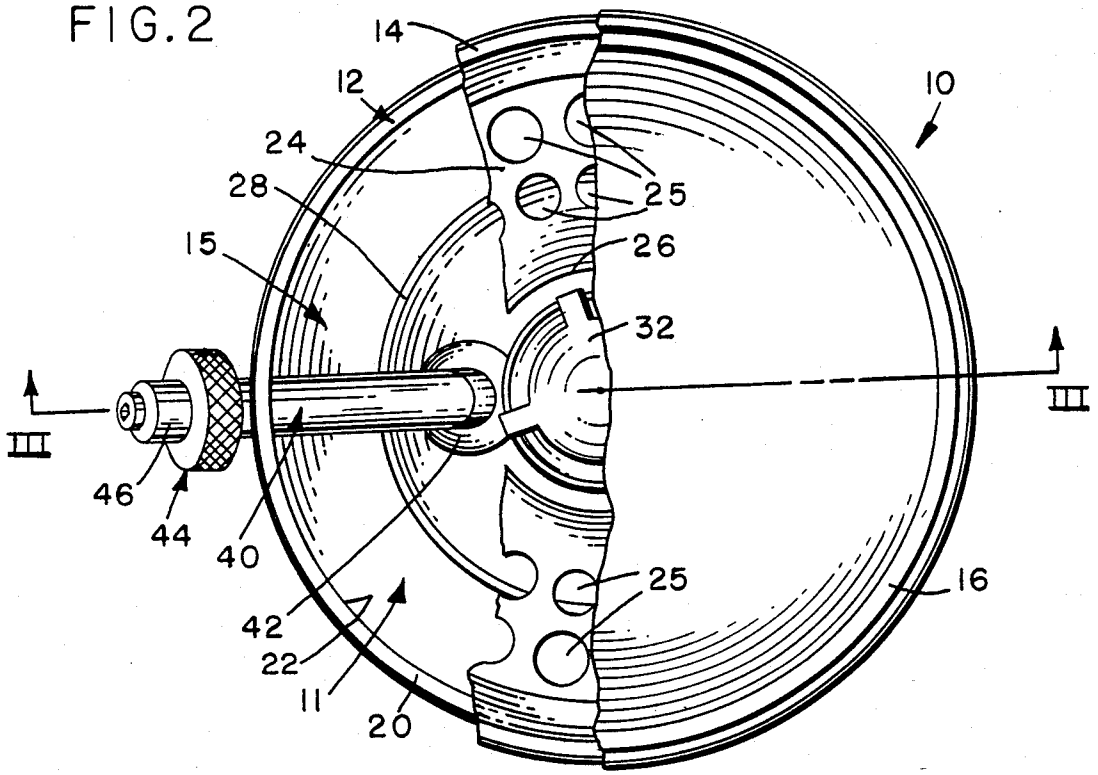
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FIG. 3

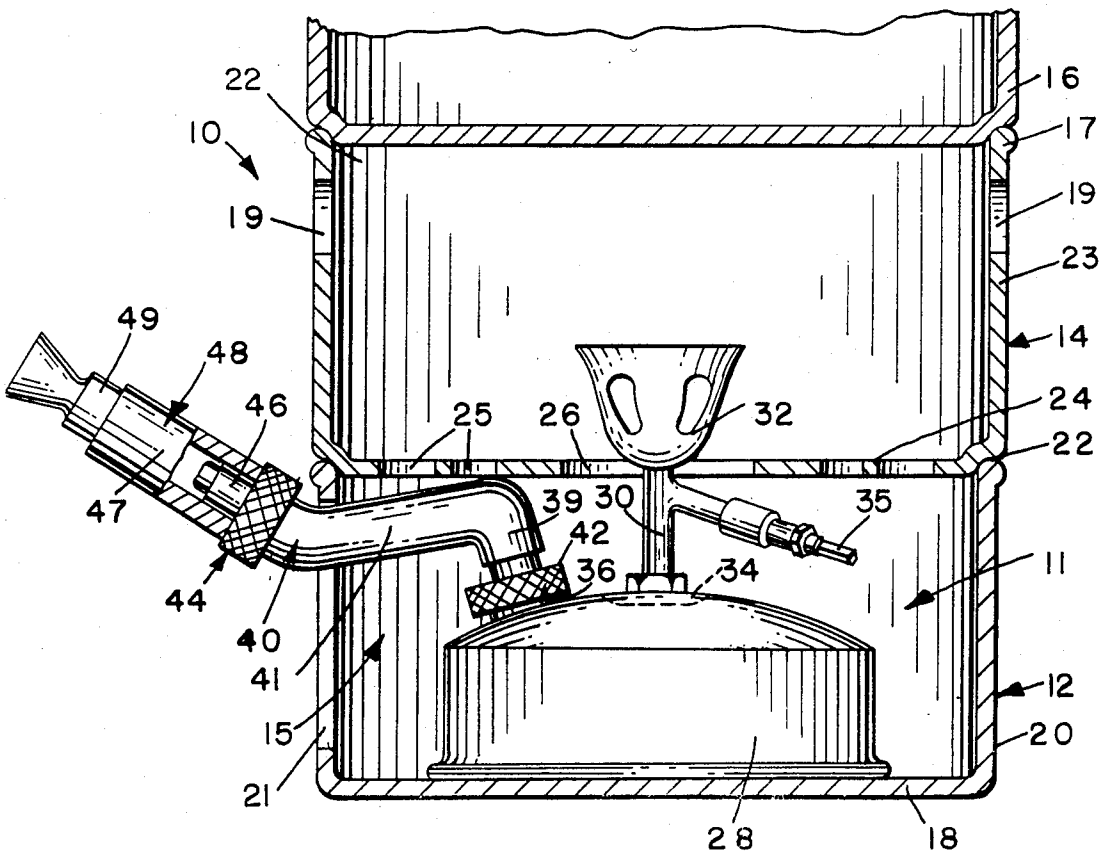
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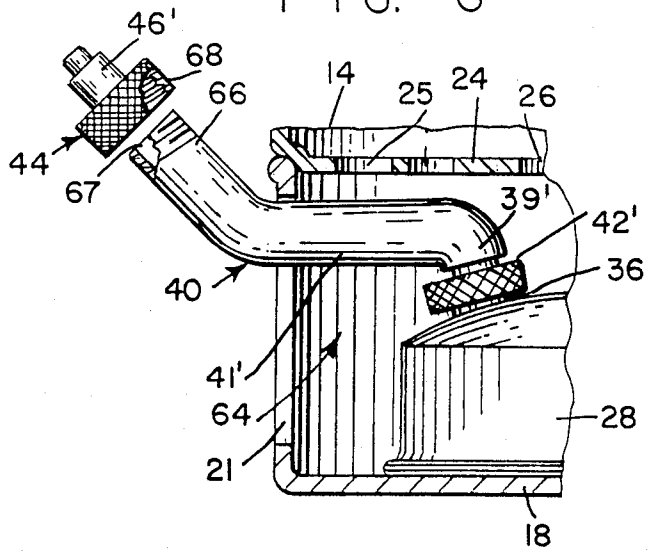
FIG. 6



PORTABLE STOVE ASSEMBLY

BACKGROUND OF THE INVENTION

The present invention is generally directed to a portable stove assembly which is used for hiking, camping, hunting, or other outdoor activities. The invention is particularly directed to a portable stove assembly which includes a stove which utilizes a liquid fuel and which is capable of being pressurized by a portable air pump.

The prior art portable stove assembly includes a camping stove which is enclosed within a pot-shaped support member for supporting a cooking pot. The support member has a bottom wall and an apertured vertical side wall. The side wall functions as a wind shield while the apertures in the side wall provide drafting to support combustion for the cooking stove. The stove includes a fuel reservoir, a tube which extends upwardly from the reservoir, and a burner unit which is attached to the top of the tube. In some cases, the burner extends above the top of the support member so that a secondary support member is used. The secondary support member is adapted to be supported on the primary support member and, in turn, supports the cooking pot. The secondary support member has a bottom wall which includes a central aperture for receiving the burner portion of the stove. The stove also includes an inlet fixture having an inlet opening for introduction of fuel. The fixture is adapted to receive a fill cap. The traditional cooking stove is provided with a shallow depression at the base of the burner tube. The method of starting this stove is to place a certain amount of fuel in the depression at the top of the reservoir. The fuel in the depression is then ignited with a match which causes the tank to be heated. When the tank is heated sufficiently, the inside of the tank becomes pressurized and causes the fuel within the tank to become vaporized. A flame nozzle which extends from the burner tube is then opened to release vaporized fuel at the burner which is then ignited. As long as there is a flame within the burner, the reservoir stays heated and pressurized. However, under certain conditions, as, for example, a cold windy day, the reservoir becomes sufficiently cooled to become depressurized. This occurs in spite of the continuous burning in the burner unit. When the reservoir becomes depressurized, the flame in the burner goes out. In an effort to solve this problem, a fill cap was developed for the inlet fixture which also has a fixture for receiving a small hand pump for pressurizing the fuel reservoir. This fill cap works quite satisfactorily for the initial pressurizing of the fuel reservoir. However, if the flame within the burner unit goes out when the stove is in use, the cooking pot has to be removed and a supporting member or members have to be dissembled in order for the fuel reservoir to be pressurized by the hand pump. If this occurs in the middle of the cooking operation, it is a source of major aggravation to the camper or hiker. A place has to be found for all of the dissembled parts of the cooking assembly and the cooking pot has a chance to cool off by the time all of the elements are dissembled and reassembled and cooking is resumed. These and other difficulties experienced with the prior art devices have been obviated in a novel manner by the present invention.

It is, therefore, a principle object of the invention to provide a portable stove assembly which enables the fuel reservoir of the stove to be pressurized without dissembling all of the elements of the cooking assembly.

Another object of this invention is the provision of a portable stove assembly which includes an air pressure assembly which enables the stove to be pressurized by a hand pump from outside of the assembly.

A further object of the present invention is the provision of a portable stove assembly which includes an air pressure assembly that extends through one of the apertures in the support member so that it is accessible from outside of the assembly.

It is another object of the present invention to provide an air pressure assembly for a portable stove assembly which is adapted to be attached at one end to the inlet fixture of the conventional stove and which has at its opposite end a gas fixture for receiving a portable air pump outside of the portable stove assembly.

A still further object of the invention is the provision of an air pressure assembly which is adapted to be attached to the inlet fixture of the stove and which enables the stove to be pressurized from outside of the portable stove assembly.

It is a further object of the invention to provide an air pressure assembly for a portable stove which enables the stove to be filled with liquid fuel and pressurized from outside of the portable stove assembly.

It is a further object of the invention to provide an air pressure assembly which is simple in construction, which is inexpensive to manufacture and which is easy to use by a camper or hiker.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

SUMMARY OF THE INVENTION

The invention consists of a portable stove assembly having a support member for a cooking pot and which includes an apertured side wall, a stove for burning liquid fuel, the stove including a fuel reservoir, and an air pressure assembly having an elongated connecting tube; a cap at one end of the tube which is adapted to engage an inlet fixture of a stove; and a gas fixture at the opposite end for receiving a portable air pump. The tube is configured so that when the air pressure assembly is attached to the fuel reservoir, the tube extends through one of the apertures in the side wall of a support member, so that the gas fixture is located outside of the support member. The invention also consists of an air pressure assembly for a portable stove as described above.

BRIEF DESCRIPTION OF THE DRAWINGS

The character of the invention, however, may be best understood by reference to one of its structural forms, as illustrated by the accompanying drawings, in which:

FIG. **1** is a front elevational view of a portable stove assembly embodying the principles of the present invention,

FIG. **2** is a plan view of the portable stove assembly with portions broken away,

FIG. **3** is a vertical cross-sectional view of the portable stove assembly taken along the line III—III of FIG. **2**,

FIG. **4** is a front elevational view of an air pressure assembly embodying the principles of the present invention,

FIG. 5 is a vertical cross-sectional view of the air pressure assembly taken along the line V—V of FIG. 4, and

FIG. 6 is a front elevational view of a modified air pressure assembly, shown applied to a portable stove.

DETAILED DESCRIPTION OF THE INVENTION

Referring first to FIGS. 1–3, the portable stove assembly of the present invention is generally indicated by the reference numeral **10** and includes a cooking stove which is generally indicated by the reference numeral **11**, a primary support member generally indicated by the reference numeral **12**, a secondary support member **14**, generally indicated by the reference numeral, and an air pressure assembly, generally indicated by the reference numeral **15**. The primary support member **12** includes a bottom wall **18** and an annular vertical side wall **20** which extends upwardly from the bottom wall **18**. The side wall **20** has three apertures, two of which are shown in FIG. **1** at **21** and **21'**. The top edge of the side wall **20** defines a top opening **22** and is adapted to support the secondary support member **14**. The secondary support member **14** also includes an annular side wall **19** which has a plurality of apertures **23**. The top edge of wall **19** defines a top opening **17** and is adapted to support a cooking pot **16**. The secondary support member **14** also includes a bottom wall **24** which is provided with a plurality of relatively small apertures **25** and a relatively large central aperture **26**.

The cooking stove **11** includes a tank-shaped reservoir **28**, a burner tube **30** which extends vertically from the top of the reservoir **28** and a burner or nozzle **32** which is attached to the top of the burner tube **30**. The top of the reservoir **28** has a depression **34** at the base of the burner tube **30**. A valve stem **35** extends from the burner tube **30** for opening a valve within the burner tube **30** for releasing pressurized fuel vapor to the burner **32**. The stove **11** is adapted to be located primarily within the primary support member **12** so that the burner or nozzle **32** extends through the central opening **26** of the secondary support member **14**. The reservoir **28** is also provided with an inlet fixture **36** which consists of a tubular projection with external threads. The inlet fixture **36** is adapted to receive a threaded fill cap.

Referring also to FIGS. **4** and **5**, the air pressure assembly **15** includes an elongated connecting tube **40**, a cap **42** which is operatively connected to one end of the tube and a gas fixture, generally indicated by the reference numeral **44** which is operatively connected to the opposite end of the tube. The gas fixture **44** includes a nipple **46** and a one-way valve which permits air flow only towards the cap **42**. The nipple **46** is adapted to receive the end of a conventional hand-operated air pump **48**. The air pump **40** includes a cylinder **47** and a piston **49** which is slidably mounted within the cylinder **47**. The particular hand pump which is used with this invention is an optimus mini pump which is manufactured by Optimus Princess Inc. of Santa Fe Springs, Calif. The gas fixture **44** is configured to mate with this pump. The elongated connecting tube **40** is configured to extend through the aperture **21** when the cap **42** is attached to the inlet fixture **36** so that the gas fixture **44** is located outside of the primary support member **12** as shown in FIGS. **1–3**. When the cap **42** is attached to the inlet fixture **36**, the adjacent portion of the tube **40** which is indicated at **39** extends substantially vertically. The remaining portion of the tube **40** which is indicated at **41** extends substantially horizontally.

Referring particularly to FIG. **5**, the cap **42** comprises an end wall **50** and an annular side wall **52** which extends from the end wall **50** and terminates in an end opening **54**. The inside surface of the side wall **52** is provided with threads for engaging the external threads of the inlet fixture **36**. The end wall **50** has a central opening **56** through which the tube **40** extends, so that the cap **42** is free to rotate about the central longitudinal axis of the substantially vertical portion **39** of the tube **40**. The tube **40** has an outer annular flange **58** which is located between the end wall **50** and the opening **54**. An elastomeric sealing washer **60** is located between the flange **58** and the opening **54**. When the cap **42** is applied to the inlet fixture **36**, the open end **62** of the tube **40** extends into the inlet fixture **36** and the cap **52** is threaded onto the inlet fixture **36** by rotating the cap **42** relative to the tube **40**. As the cap **42** is tightened, the top edge of the inlet fixture **36** engages the washer **60** which is compressed between the inlet fixture **36** and the flange **58** to provide a gas seal between the cap **42** and the inlet fixture **36**.

The operation and advantages of the present invention will now be readily understood in view of the above description.

The portable stove assembly **10** of the present invention is utilized by first placing the stove **11** within the primary support member **12** and, preferably, positioning the stove so that the valve stem **35** is accessible from one of the apertures in the primary support member, as for example aperture **21'** as shown in FIG. **1**. The stove **11** is provided with a key, not shown, which can be inserted through the aperture **21'** for engaging the valve stem **35** for releasing fuel vapor to the burner **32**. The air pressure assembly **15** is positioned on the burner **11** so that the cap **42** engages the inlet fixture **36** and the connecting tube **40** extends through the aperture **21** so that the gas fixture **44** extends outside of the primary support member **12**. The cap **42** is screwed onto the inlet fixture **36**. When the cap **42** is applied to the fixture **36**, the portion **39** of the tube **40** extends primarily vertically to a point just below the top edge of the wall **20** and the portion **41** is predominatly horizontal so that it extends through the aperture **21**. Since the cap **42** can be rotated relative to the tube **40**, the tube **40** can be positioned so that it extends through one of the apertures (aperture **21**) in the primary support member and the stem **35** can be aligned with one of the other apertures, (aperture **21'**) while the cap **42** is tightened onto the inlet fixture **36**. For example, in the primary support member **12** which is illustrated in FIG. **1**, there are three apertures spaced 120° apart. The connecting tubes **40** and valve stem **35** can be positioned so that they are 120° apart relative to the central vertical axis of the stove **11** so that the connecting tube **40** and the stem **35** are aligned with the apertures **21** and **21'**, respectively. The relative positions of the tube **40** and the valve stem **35** can be maintained while the cap **42** is fully tightened onto the fixture **36**. The position of the tube **40** relative to the valve stem **35** can be adjusted to correspond to a primary support member having apertures which are located less than 120° or more than 120° from each other.

When the cap **42** is fully tightened onto the inlet fixture **36**, the secondary supporting member **14** is positioned on top of the primary supporting member **12** and the cooking pot **16** is positioned on top of the secondary support member **14**, as shown in FIGS. **1** and **3**. Assum-

ing that the reservoir **28** of the stove **11** contains fuel, the stove **11** is now ready for lighting. The pump **48** is applied to the nipple **46** and the piston **49** is reciprocated within the cylinder **47** for pressurizing the reservoir **28**. The pump **48** is then removed from the nipple **46** and the valve within the tube **30** is opened by rotating the valve stem **35** by an appropriate valve key, not shown. This releases fuel vapor into the burner **32** and the vapor is ignited with a match. The cooking pot **16** is then placed on top of the secondary support member **14** for cooking. Normally, the reservoir **28** remains pressurized from the heat which is generated by the burner **32** so that fuel vapor feeds continuously to the burner **32** to sustain combustion. If, however, the flame within the burner **32** is extinguished due to exceptionally windy conditions or extreme cold which lowers the temperature of the reservoir **28**, the stove can be restarted by applying the pump **48** to the nipple **46** thereby re-pressurizing the reservoir **28**. The burner **32** can be ignited by removing the cooking pot **16** and applying a match to the burner **32** or by inserting the match through one of the apertures **23** in the side wall **19** of the secondary support member **14**. The versatility of the air pressure assembly **15** enables it to be applied to any portable stove assembly which includes a stove having an inlet fixture and a support member which has at least one aperture in the side wall.

MODIFIED AIR PRESSURE ASSSEMBLY

Referring to FIG. **6**, there is shown a modified air pressure assembly which is generally indicated by the reference numeral **64**. Air pressure assembly **64** is shown operatively attached to the inlet fixture **36** of the fuel reservoir **28**.

The air pressure assembly **64** includes an elongated connecting tube **40'** and a cap **42'** which is operatively connected to one end **39'** of the tube **40'**. The opposite end of the tube **40'** is indicated by the reference numeral **66**, has an end opening **67** and a threaded outer surface. A gas fixture **44'** includes an annular flange **68** which has an inner threaded surface and a nipple **46'**. The nipple **46'** is adapted to receive the hand pump **48** and the flange **68** enables the gas fixture **44'** to be screwed onto the threaded end **66** of the tube **40'**. The ends **66** and **39** of the tube **40** are connected by a substantially straight portion **41'**. When the cap **42'** is applied to the inlet fixture **36** as shown in FIG. **6**, the straight portion **41'** extends substantially horizontally through the aperture **21** of the primary support member **12**. The end **66** of the tube **40'** extends at an angle to the portion **41'** so that when the cap **42'** is applied to the fixture **36**, the end **46** extends outwardly from the aperture **21** at an upward angle. The threaded end **66** is adapted to receive a fill cap or the gas fixture **44** for enabling the reservoir **28** to be pressurized by the air pump **48**. The end opening **67** is adapted for receiving a fill funnel for supplying liquid fuel to the reservoir **28**. The end opening **67** is located at a sufficient distance above the rest of the connecting tube **40'** to enable liquid fuel to flow from the opening **67** and through the tube **40'** into the reservoir **28**. The cap **42'** is connected to the end **39'** in the same manner as cap **39** is connected to the portion **39** of the tube **40**.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by Letters Patent is:

1. Portable stove assembly comprising:

(a) a support member for a cooking utensil, said support member having a bottom wall and a continuous side wall extending vertically from the bottom wall, said side wall having at least one aperture,

(b) a stove for burning liquid fuel, said stove being freely supported on said bottom wall within the side wall of the support member and having a fuel reservoir, a tube which extends upwardly from the reservoir, a burner unit which is attached to the top of the tube, an inlet fixture at the top of the reservoir which comprises a tubular projection with external threads for receiving a fill cap having internal threads, said fixture having an inlet opening to the reservoir for filling the reservoir with fuel, and

(c) an air pressure assembly comprising:

(1) a cap which has an end wall, a central opening in said end wall, an annular side wall extending from said end wall and having an open end and internal threads for enabling the cap to be threaded onto said inlet fixture,

(2) an elongated connecting tube, one end of which has an opening and extends through said central opening so that said cap is free to rotate relative to said connecting tube, said connecting tube having an outer annular flange which is located between said end wall and the open end of said cap,

(3) an elastomeric sealing washer between the flange and said open end for engaging the end of said tubular projection and for being forced against said flange by said tubular projection when the cap is threaded onto the threaded projection to form a gas seal between the cap and said tubular projection, and

(4) a gas fixture which is operatively connected to the opposite end of said connecting tube and which is adapted for operatively receiving a portable air pump, said connecting tube being configured so that when said cap is attached to said inlet fixture, the connecting tube extends through said aperture so that said gas fixture tube lies outside of the side wall of said support member.

2. Portable stove assembly as recited in claim **1**, wherein said gas fixture has a one way valve which allows air to flow only from the gas fixture to the connecting tube.

3. Portable stove assembly as recited in claim **1**, wherein when said air pressure assembly is attached to said inlet fixture, said one end of the connecting tube has a substantially vertical orientation and the remainder of the connecting tube has a predominantly horizontal orientation.

4. Portable stove assembly as recited in claim **1**, wherein said gas fixture is removably attached to the opposite end of said connecting tube.

5. Air pressure assembly for a portable stove assembly having a support member which includes a bottom wall and a continuous side wall with at least one aperture, and a stove for burning liquid fuel being freely supported on said bottom wall within the side wall of the support member and having a fill cap having internal threads, said fixture having an inlet opening to the

reservoir for filling the reservoir with fuel, said air pressure assembly comprising:

(a) a cap which has an end wall, a central opening in said end wall, an annular side wall extending from said end wall and having an open end and internal threads for enabling the cap to be threaded onto said inlet fixture,

(b) an elongated connecting tube, one end of which has an opening and extends through said central opening so that said cap is free to rotate relative to said connecting tube, said connecting tube having an outer annular flange which is located between said end wall and the open end of said cap,

(c) an elastomeric sealing washer between the flange and said open end for engaging the end of said tubular projection and for being forced against said flange by said tubular projection when the cap is threaded onto the threaded projection to form a gas seal between the cap and said tubular projection, and

(d) a gas fixture which is operatively connected to the opposite end of said connecting tube and which is adapted for operatively receiving a portable air pump, said connecting tube being configured so that when said cap is attached to said inlet fixture, the connecting tube extends through said aperture so that said gas fixture tube lies outside of the side wall of said support member.

6. Air pressure assembly as recited in claim **5**, wherein said gas fixture has a one way valve which allows air to flow only from the gas fixture to the connecting tube.

7. Air pressure assembly as recited in claim **5**, wherein said gas fixture is removably attached to the opposite end of said connecting tube.

8. Air pressure assembly as recited in claim **7**, wherein said gas fixture has an annular flange with internal threads and the opposite end of said connecting tube has external threads for receiving the annular threaded flange of said gas fixture.

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