

[54] **PORTABLE STOVE**  
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### [30] Foreign Application Priority Data

Feb. 2, 1973	Sweden.....	7301471
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[52] U.S. Cl..... **126/44; 126/9 R; 126/38; 126/50; 431/247**

[51] Int. Cl..... **F24c 5/20**

[58] Field of Search..... **126/44, 38, 50, 9 R; 431/247**

### [57] ABSTRACT

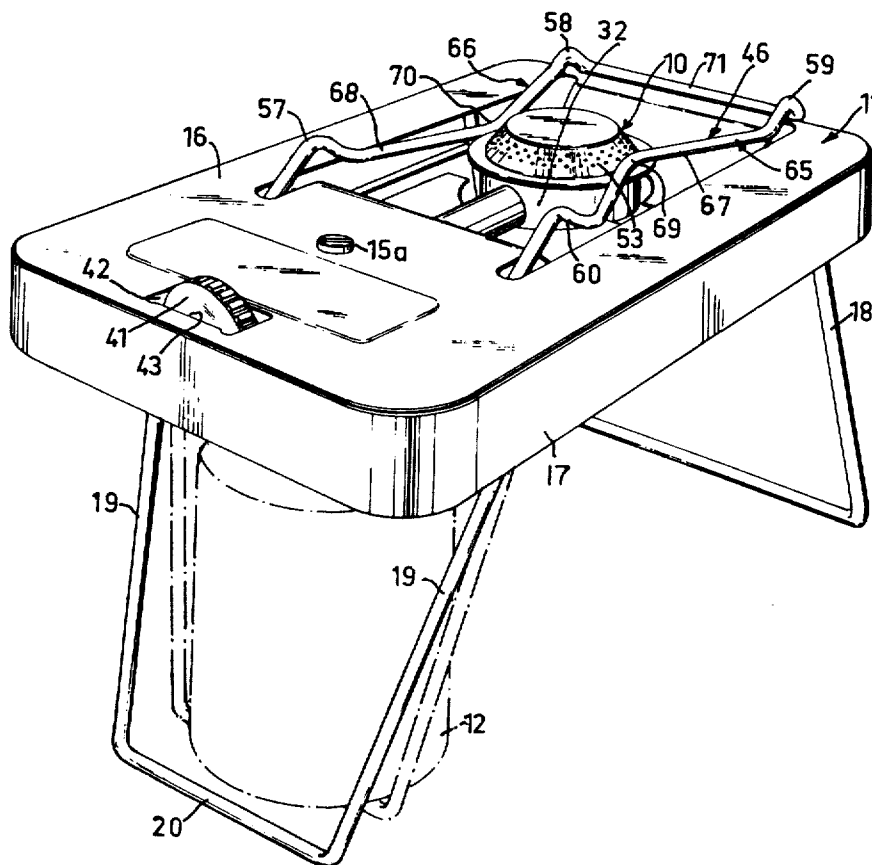
A collapsible weight small sized portable stove for butane fuel from a disposable cartridge. The vaporizing or preheating tube is in the form of a loop having at least one portion located in the region passed by the flames and being formed and positioned for supporting a cooking utensil such as a saucepan.

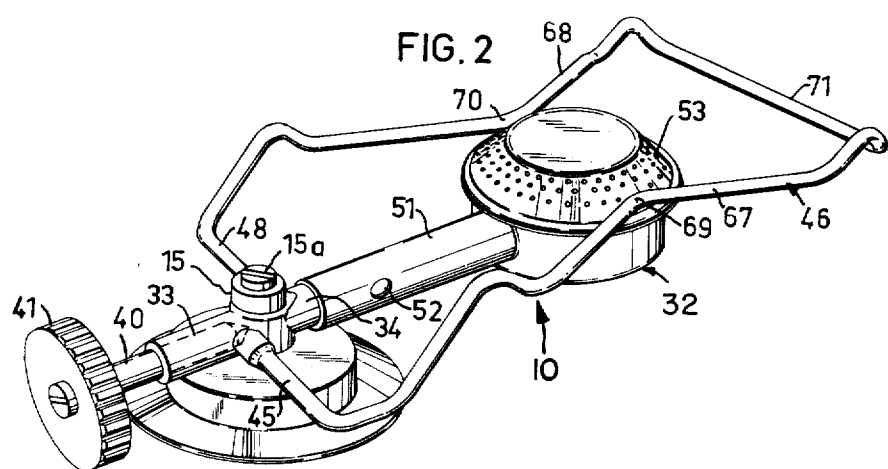
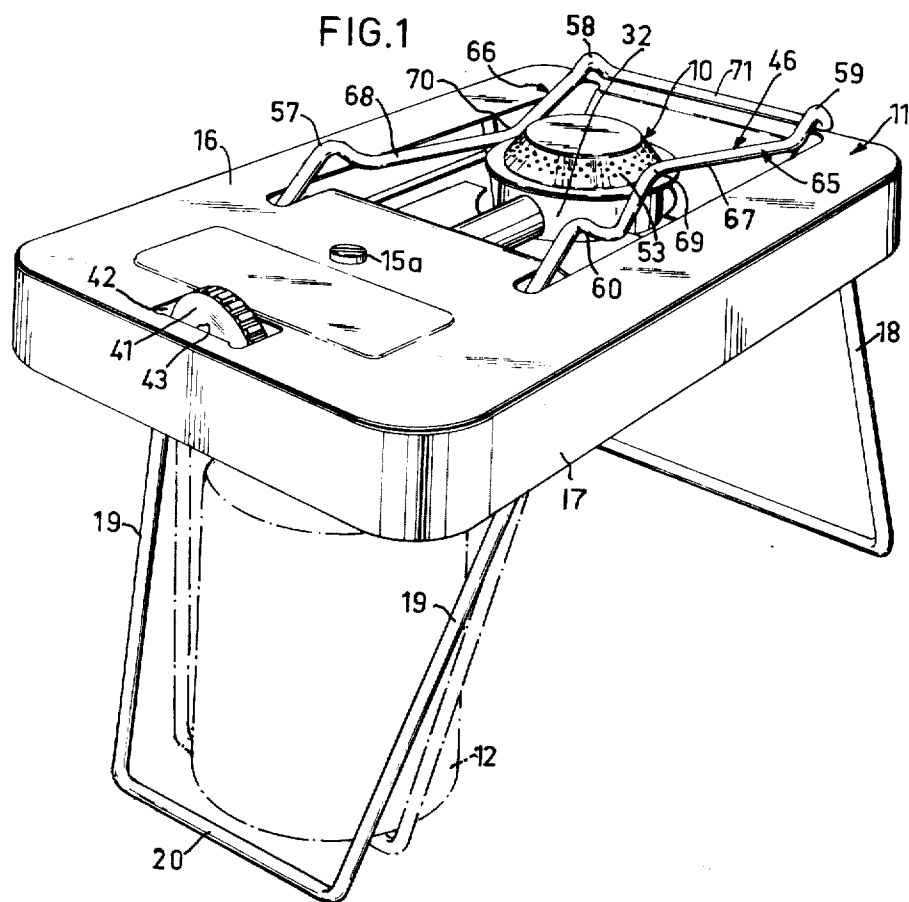
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**9 Claims, 12 Drawing Figures**





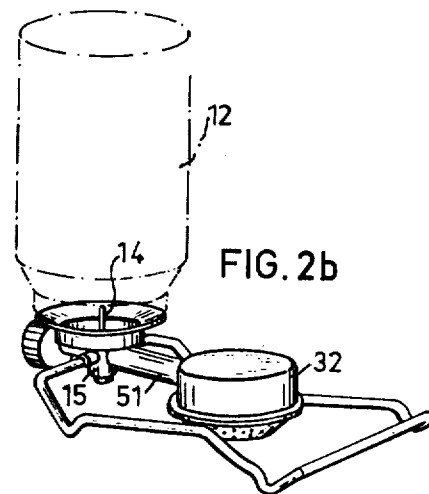
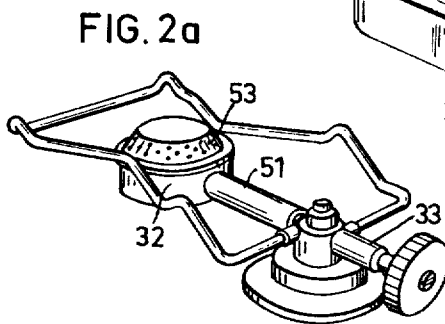
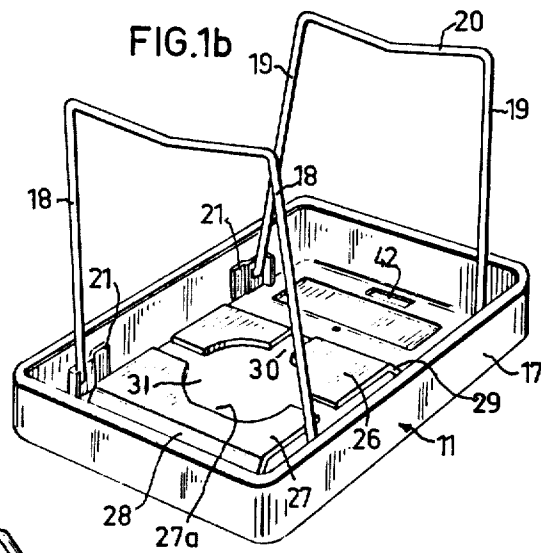
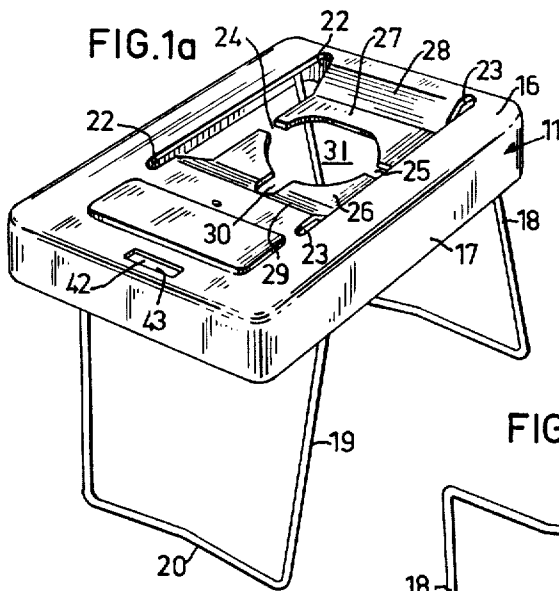


FIG. 3

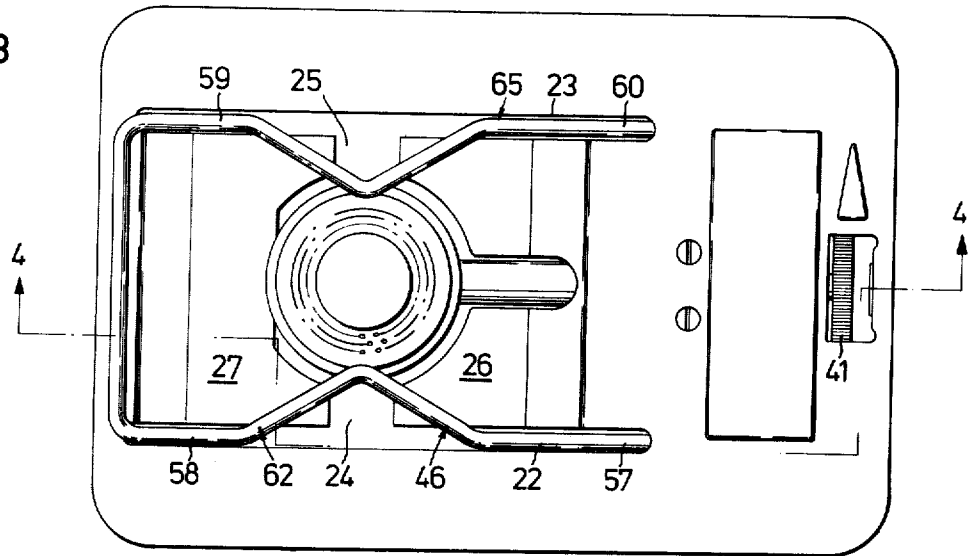


FIG. 4

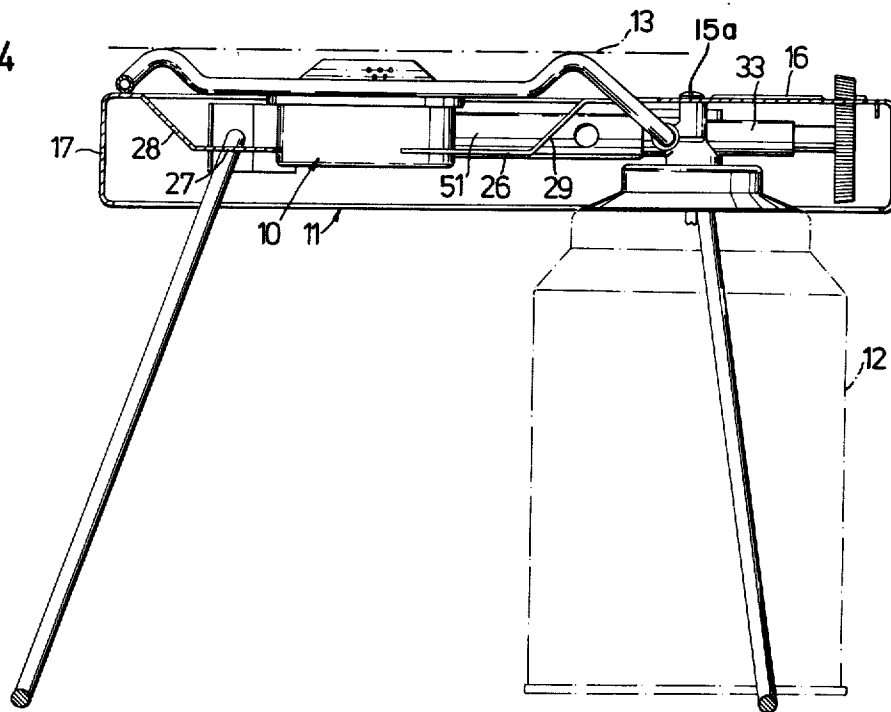


FIG. 5

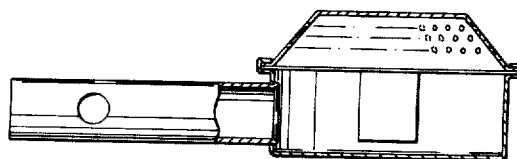


FIG. 6

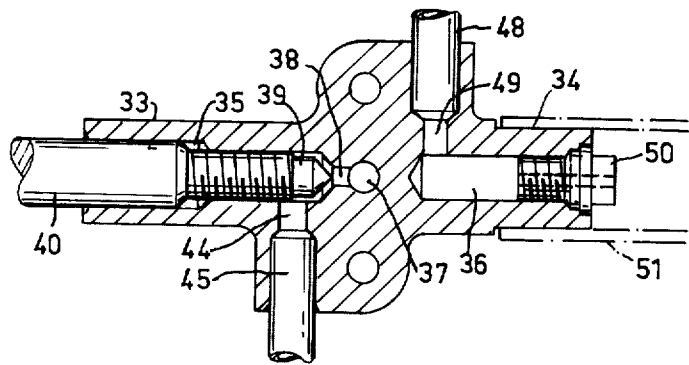


FIG. 7

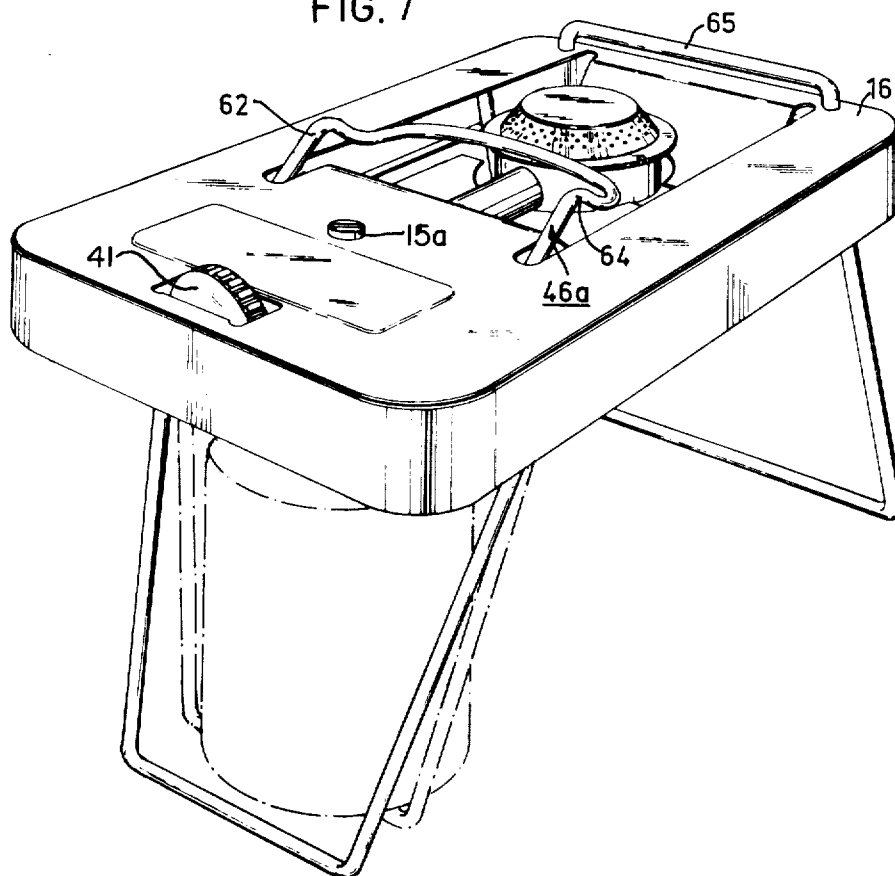
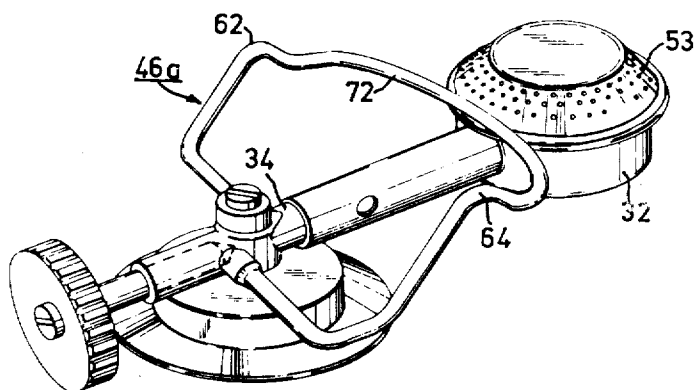


FIG. 8



## PORTABLE STOVE

The present invention relates to a portable stove comprising a burner apparatus and a stove stand for supporting the burner and a disposable cartridge for liquified gas such as butane.

The general object of the invention is to provide a portable stove which is intended for liquified fuel gas such as butane and which may be collapsed to small dimensions when not in use and which has a preheating tube for effectively vaporising the liquified gas before entering the burner head of the burner apparatus.

Another object of the invention is to provide a portable stove having simple windshield means which will reduce the influence of wind on the flame and on the vaporising tube so that the flame will be kept relatively steady and the vaporising tube will be kept at a high temperature and reach the desired temperature quickly when starting up the stove.

These and other objects will be attained with the invention as explained more in detail in the following specification with reference to the accompanying drawings showing by way of example preferred embodiments of the inventive stove, the features of which being set forth in the claims.

## IN THE DRAWINGS

FIG. 1 is a perspective view of one embodiment of the portable stove according to the invention,

FIG. 1a is a perspective view of only the portable stand of FIG. 1 with the burner apparatus and disposable fuel cartridge removed,

FIG. 1b is a bottom perspective view of the underside of the stand of FIG. 1a,

FIG. 2 is a perspective front view of the burner apparatus alone,

FIG. 2a is a perspective front view of the burner from opposite side relative to FIG. 2,

FIG. 2b is a bottom perspective view of the burner apparatus,

FIG. 3 is a plan view of the top of the stove,

FIG. 4 is a sectional view of the stove along line 4-4 in FIG. 3,

FIG. 5 is a sectional view of the burner head,

FIG. 6 is a sectional view of the valve housing,

FIGS. 7 and 8 are views similar to FIGS. 1 and 2 of another embodiment of the stove.

With reference to FIGS. 1 to 6, the stove comprises a burner apparatus 10, a stand 11, for supporting the burner apparatus and a disposable fuel cartridge 12 of standard type for liquified butane. A cooking utensil such as a saucepan with a bottom 13 may be placed on the stove as indicated in FIG. 4.

The fuel cartridge 12 is a cylindrical container which at its top end has an opening for inserting a connecting pipe 14 of the valve housing 15 (FIG. 2b). When the pipe 14 is inserted in the cartridge, a non-return valve is opened for admitting fuel liquid through the connecting pipe into the valve housing 15 of the burner apparatus.

The stand 11 comprises an inverted trough of sheet metal having a top plate 16 and a closed frame defined by side flanges 17. A pair of rear legs 18, 18 and front legs 19, 19 are pivotally mounted to the flanges 17 and may be collapsed to a position under the top plate and within the frame formed by side flanges 17. The front legs, 19 are formed by a U-shaped wire having a hori-

zontal intermediate portion 20 which may be moved to a position under the bottom of the cartridge 12 (dotted line position) to secure the cartridge to the burner apparatus as illustrated in FIGS. 1, 2b and 4.

Small lugs 21 are welded to the inside of the flanges 17 and are provided with holes for receiving the ends of the legs 18, 19 as shown in FIG. 1b.

The top plate 16 is provided with two longitudinal parallel spaced slots 22, 23. The portion of the top plate between the slots is divided by means of transverse slots 24, 25 into two bottom portions 26, 27 connected to the top plate by sloping opposite end walls 28, 29 so that the bottom portions are located in a lowered position at a level about half of the height of the flanges 27. One of the end walls has a central longitudinal slot 30. The end edges of the bottom portions 26, 27 have been cut to form an opening 31 for the burner head 32.

The valve housing 15 is secured by one or more screws 15a to the underside of the top plate.

At opposite ends of the valve housing are axially extending studs 33, 34 having cylindrical bores 35, 36. In the bottom of the valve housing is a vertical bore 37 (FIG. 6) in which the connecting pipe 14 is mounted. Liquid fuel enters the vertical bore and passes through a channel 38 to a metering valve having a valve member 39 at the end of a control rod 40 which by means of threads is axially movable in the stud 33. The control rod 40 has a control knob 41 which is mounted so that a portion thereof projects through an aperture 42 in the top plate. The aperture permits desired axial movement of the knob 41, but the outer edge 43 of the aperture forms a stop member preventing the rod from being disengaged from the stud 33. When the metering valve is open, the fuel flows into a transverse bore 44 (FIG. 6) to which one end 45 of the vaporizing tube 46 is connected. The other end 48 of the vaporizing tube is connected to another transverse bore 49 in the valve housing and this bore is in communication with the axial bore 36 in the stud. At the end of bore 36 is an orifice 50.

Inserted into the stud 34 is one end portion of a tube 51, which at its other end supports the burner head 32. The tube 51 is provided with a primary air opening 52.

The mixture of vaporized fuel and air enters the burner head and flows upwardly to a spreader member 53 in the form of a frustoconical member having a plurality of gas outlet openings. As will be understood from FIG. 4, the gas outlet openings are positioned close to the bottom 13 of the saucepan or similar utensil placed on the stove.

The tube 51 of the burner apparatus passes freely through the central slot 30 in the bottom portion 26 and wall 29. The burner head 32 is positioned between the opposite recessed edges of the bottom portions 26, 27. However, the edge 27a of the bottom portion 27 forms an axial stop for the burner head 32 to keep its tube 51 in position on the stud 34 of the valve housing.

As will be understood particularly from FIG. 4, the flanges 17 form a windshield around the burner apparatus and its burner head and due to the fact that the top plate will have a recessed portion in the region around the burner head because of the lowered position of the bottom portions 26, 27, there will be an enlarged partially closed space around the burner head so that the main portion of the secondary air will enter through the windshieldded slots 22, 23, 24, 25 in the top plate into

said space. The combustion gases and the flames can leave said space through the relative narrow gap between the bottom 13 (FIG. 4) of the cooking utensil and the top plate 16. The slots 22, 23, 24, 25 have a wind shielded position behind the flanges so that the air flow through the slots will be relatively steady also when the stove is used under weather conditions with strong winds.

In order to obtain an effective heating of the vaporizing tube 46 it is shaped as a loop having at least one portion located in the vicinity of the burner head so that the flames will effectively heat the tube as will be understood from FIGS. 1 and 7.

The configuration of the loop of the vaporizing tube may generally have the shape indicated in FIGS. 1 and 2 or as an alternative as indicated in FIGS. 7 and 8.

In order to simplify the construction of the stove at least some of the members for supporting the cooking utensil with its bottom at a desired closely spaced distance above the burner head are comprised of portions of the vaporizing tube which to this end is bent locally at the places shown in FIGS. 2 and 8 to form upwardly projecting supporting feet. In FIGS. 1 and 2 there are four such supporting feet 57, 58, 59, and 60, and in the embodiment of FIGS. 7 and 8 the vaporizing tube is formed with two supporting feet 62, 64, which together with a rear support member 65 secured to the plate 16 form the supporting members for the cooking utensil.

By using part of the vaporizing tube 46 in FIG. 1 or 46a in FIGS. 7 and 8 as a support for the cooking utensil, the position of the main part of the vaporizing tube will be located in the region of the flames, that is in the small gap between the top plate 16 and the bottom 13 of the cooking utensil, as will be understood from FIG. 4.

The main difference between the embodiments in FIG. 2 and FIG. 8 of the vaporizing tube respectively is that the loop of the vaporizing tube 46 in FIG. 2 is much longer than the loop of the vaporizing tube 46a in FIG. 8.

The longer loop of the vaporizing tube in FIG. 2 is used to form two side legs 65, 66 having inwardly extended bends 67, 68 in one and the same plane so that the inner ends 69, 70 of the bends will rest on the burner head and prevent rotation of the same on the stud 34 of the valve housing. The side legs 67, 68 are connected by a transversely aligned end connecting portion 71 which rests on the top plate 16. Accordingly, the forces on the feet 57, 58, 59, 60 will be transmitted to the top plate via the transverse portion 71 and the screw or screws 15a securing the valve housing to the top plate.

However, a long vaporizing tube will extend the time between adjustment of the knob 41 and the corresponding change of the flame, and therefore it may in some applications be convenient to have a shorter vaporizing tube such as the tube 46 shown in FIGS. 7 and 8. In this embodiment the vaporizing tube 46a extends in a transverse loop portion 72 between the feet 62, 64 and engages the burner head 32 to prevent rotation of the same on the stud 34. Also in this embodiment the flames will effectively heat the vaporising tube, but the extra member 65 will complicate the manufacture to some extent, and further the attachment of the burner apparatus must be designed with respect to increased forces on the screw 15a.

What I claim is:

1. A burner assembly comprising:

a housing having a first inlet opening;

an inlet pipe extending from said housing first inlet opening for releasable attachment to a fuel cartridge;

a burner head;

a connecting tube coupled between said housing and said burner head;

a first outlet opening in said housing;

a first passageway in said housing extending between said first inlet and said first outlet opening;

a second inlet opening and a second outlet opening in said housing;

a second passageway extending between said second inlet and outlet openings; said connecting tube communicating with said second outlet opening;

a hollow elongated vaporizing tube having its free ends respectively coupled to the first outlet opening and second inlet opening of said housing for delivering fuel from said cartridge to said burner apparatus;

said vaporizing tube having at least an intermediate portion thereof positioned in close proximity to said burner head for heating said vaporizing tube during the burning of fuel to vaporize the fuel flowing through the vaporizing tube as the fuel is fed to the burner head;

said vaporizing tube being bent to form a support for a utensil positioned above the burner head.

2. A stove as defined in claim 1, in which the loop of the vaporizing tube extends around the burner head and has two side legs on opposite sides of the burner head and a transverse leg connecting the ends of the side legs, the vaporizing tube being formed with local upwardly extending bends to provide supporting feet at the ends of said legs to support a cooking utensil, with said transverse leg resting on the upper side of the top surface.

3. A stove as defined in claim 1, in which said loop has a transverse middle portion positioned on the same side of the burner head as the valve housing and in close proximity to the burner head.

4. A stove as defined in claim 1, in which the burner head connecting tube is loosely inserted and rotatable about a stud projecting from the valve housing second outlet opening and said loop of the vaporizing tube is formed with at least one portion engaging the burner head to prevent rotation thereof on said stud.

5. A portable stove comprising:

a burner assembly;

a stand for supporting said burner assembly, said stand including means for releasably securing a disposable fuel cartridge to said stand;

said stand comprising a metallic sheet forming a top surface and downwardly depending side flanges;

said burner assembly comprising a valve housing secured to the underside of said top surface and having means for releasable coupling to a fuel cartridge outlet;

a burner head; an outlet opening in said housing; a tube connecting the burner head to the housing outlet opening;

a hollow elongated vaporizing pipe extending between a pair of openings in said valve housing for coupling the inlet coupling means to the housing outlet opening;



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said top surface having a recessed opening for receiving said burner head;  
said vaporizing pipe being arranged to form a loop having a portion thereof in close proximity to said burner head for vaporizing fuel passing there-through towards said burner head;  
the looped portion of the vaporizing pipe serving as a means for supporting a cooking utensil a spaced distance above said burner head.

6. The portable stove of claim 5, wherein said valve housing further comprises valve means for regulating the rate of flow of fuel entering into said vaporizing pipe.

7. The portable stove of claim 5, wherein said top surface is provided with slots adjacent said opening for

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positioning and supporting the vaporizing pipe.

8. A stove as defined in claim 7, in which the recessed slotted portion of said top surface is positioned intermediate the top surface and the bottom edges of the side flanges.

9. The portable stove of claim 5, further comprising a first and second set of supporting legs pivotally secured to the underside of said stand for supporting said stand when in the extended position and being confined within said side flanges when in the collapsed position; said cartridge securing means comprising one of said legs and having a U-shaped configuration adapted to support a fuel cartridge therebetween when in the extended position.

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