United States Patent

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[54] MINIATURE CAMP STOVE

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[52] **U.S. Cl.** **126/38,** 431/344

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

[58] **Field of Search** 431/344, 353; 126/38, 44

[56] **References Cited**

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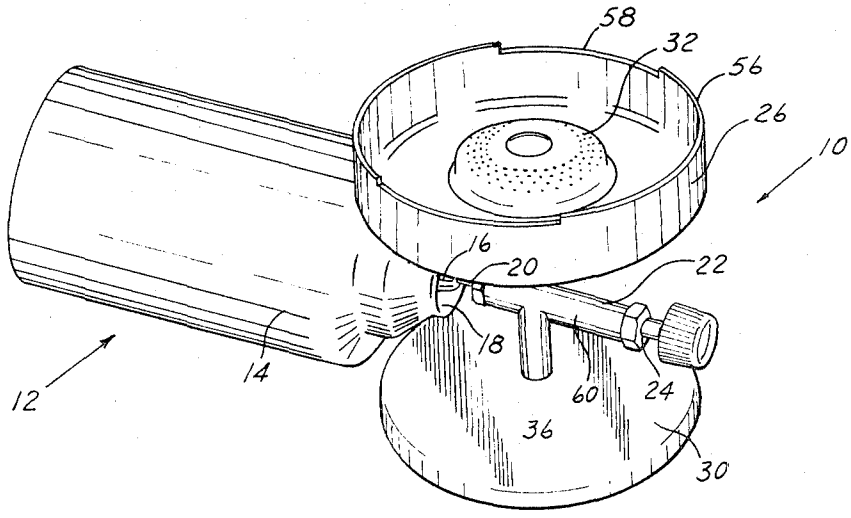
[57] **ABSTRACT**

This invention relates to a miniaturized camp stove consisting of a shallow cup-shaped receptacle with a lid that houses a burner and valved gas fitting in disassembled relation. When assembled, the receptacle fits atop of a branch of the gas fitting and provides the support for the cooking vessel when held firmly in place by the burner functioning as a fastener. Another branch of the fitting fastens onto the lid which thus provides a pedestal-type base for the unit. The main stem of the fitting is disposed horizontally with respect to the aforementioned branches and one end thereof houses a hollow needle of the type adapted for insertion into the rubber valve of a fuel canister while the other end contains a flow control valve.

16 Claims, 6 Drawing Figures



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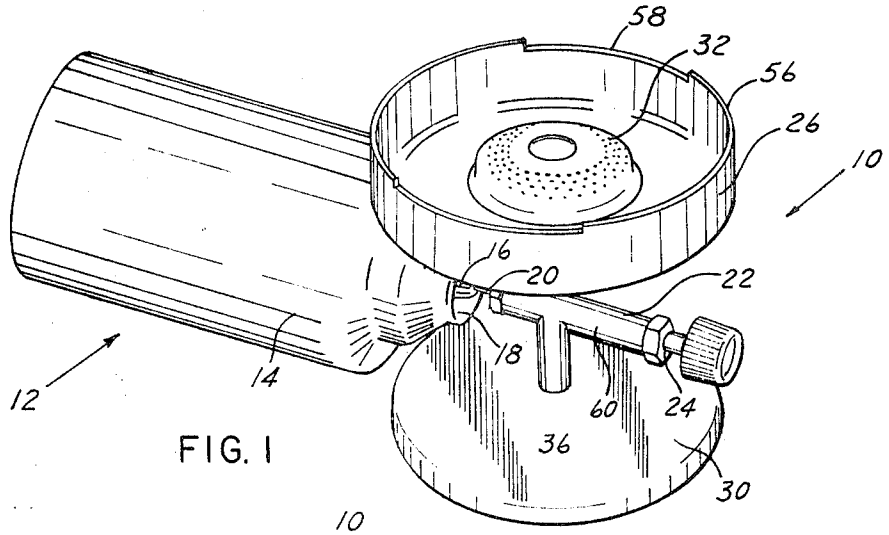

FIG. 1

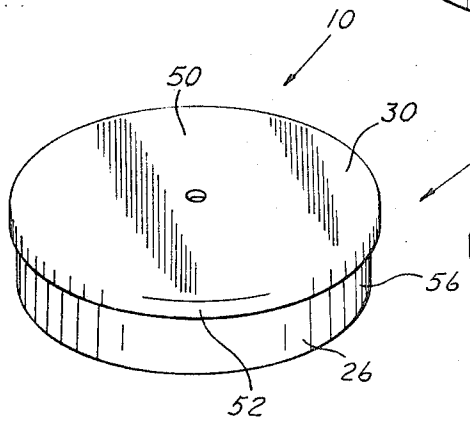

FIG. 2

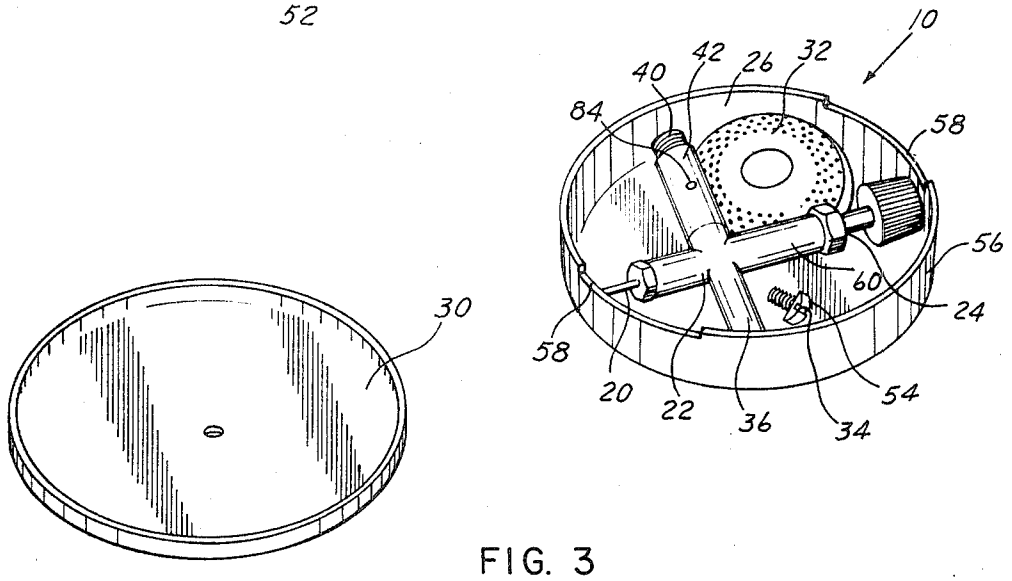

FIG. 3

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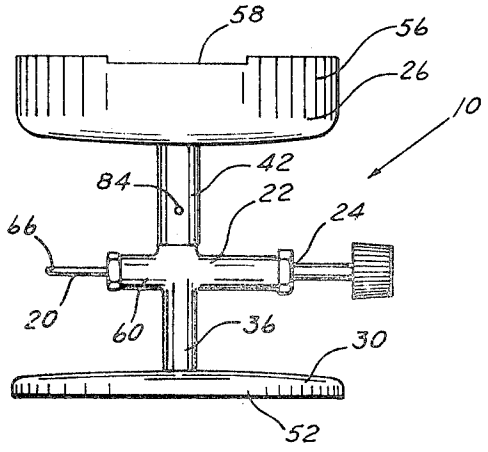

FIG. 4

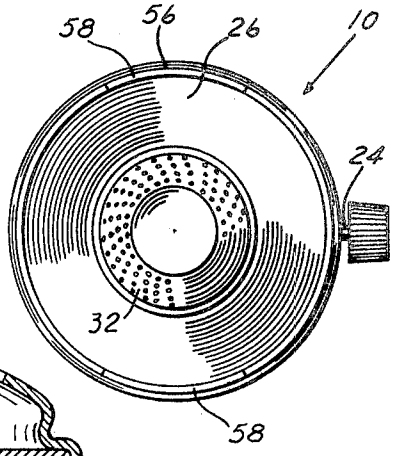

FIG. 5

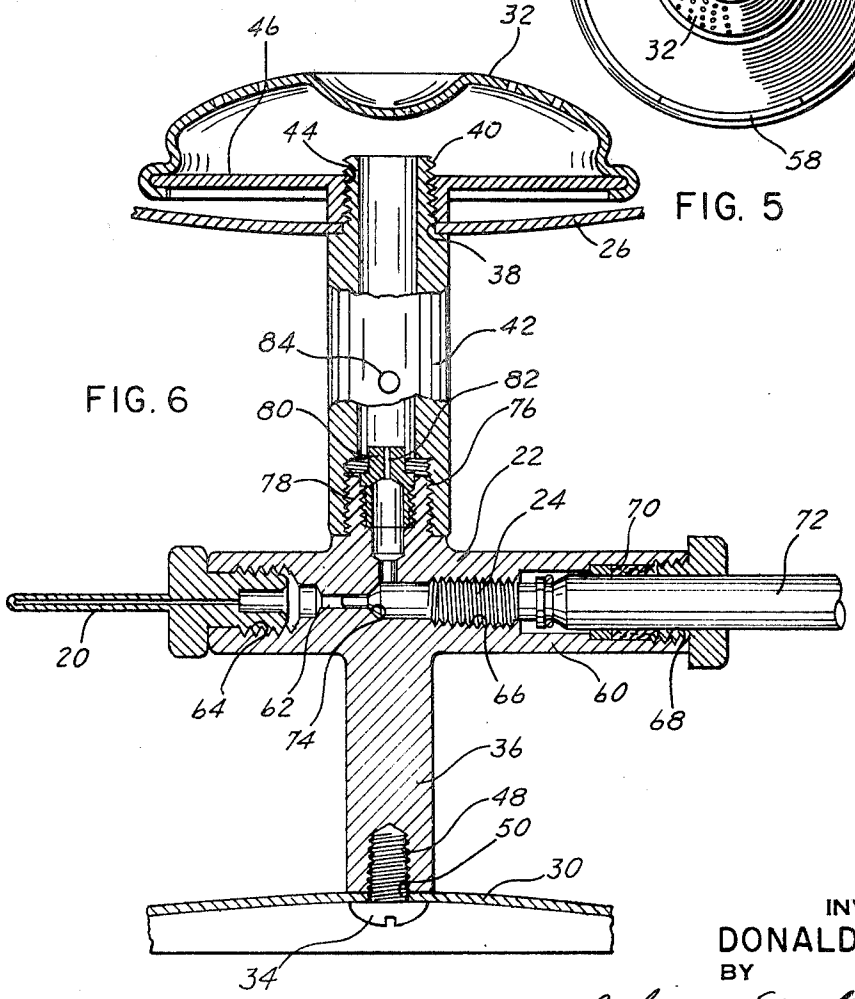

FIG. 6

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MINIATURE CAMP STOVE

The present increased emphasis on physical fitness has caused ever-increasing numbers of people to take up hiking as a form of recreation in contrast to the more sedentary activities which do little to promote good health. Advocates of this type of physical activity range all the way from people walking a gentle "nature trail" through the woods to explorers and mountain climbers challenging the most formidable objectives nature has to offer. In either of the above cases, and all in between, the common problem shared by each is having to carry all of the necessities of life on one's back. That medium-sized can of fruit in heavy syrup that seemed so tempting on the grocer's shelf can become an intolerable burden on a high country wilderness trail through the brush, across boulder fields and climbing over fallen logs. Accordingly, there has been an increasing effort made to reduce both the size and weight of the food, shelter, clothing and related gear carried by back-packers, especially by the makers of mountaineering equipment where these factors achieve prime importance.

While the warmth problem is taken care of quite satisfactorily by down-filled outerwear and sleeping bags coupled with a one-man tent for inclement weather, the problem of food and how to cook it is not so easily disposed of. A fair variety of dried and powdered or pelletized foods have been developed that provide excellent nourishment and are even fairly palletable if not truly appetizing. The difficulty is that many of these foods must be reconstituted with water and heated before they can be eaten. Since one cannot rely on finding firewood available in many sections of the country and in most wilderness areas of the type frequented by back-packers, open fires are prohibited altogether, some type of stove becomes a necessity.

Over the years there have been many attempts made to develop a truly compact and lightweight stove that will still put out sufficient heat over a long enough period of time to do the necessary cooking and also makes provision for supporting the vessel containing the food. Many such units exist in the prior art and each seems to possess certain advantageous features along with enough poor ones to prevent its being generally accepted by those who have need of same.

Apart from the previously-mentioned obvious requirements that an acceptable unit for this purpose must be both light and small, some of the other more serious shortcomings of the prior art units are their inability to stay lit under windy conditions, insufficient and inefficient utilization of the available heat, instability, and hazardous to use and pack. All of the foregoing, on the other hand, are absolutely necessary in a well designed back-pack stove. For instance, since one is obligated to carry a supply of fuel as well as the stove, the latter must be so designed as to transfer as much as possible of the heat being generated directly to the cooking food rather than allowing substantial losses thereof to the atmosphere. Stability becomes important when one considers that generally a minimum amount of food is available and spilling any at all means a loss of much needed nourishment and energy occasionally needed for survival itself. The weather conditions under which a back-packer's stove is used are seldom ideal and may even be extremely adverse so that it becomes imperative that the unit function properly in bad weather where hot food is most needed.

It has now been found in accordance with the teaching of the instant invention that these and other shortcomings of the prior art back-pack stoves have been substantially eliminated while providing a unit that is even smaller, lighter and more compact than other stoves for the same purpose that still have one or more serious disadvantages of the type aforementioned. The present stove weighs but a few ounces and in stored condition is easily small enough to be carried in a pant or jacket pocket. The design is such that it is virtually wind and weather proof because, with a cooking vessel in place atop the burner, only narrow combustion air intake slits remain open to the elements. Even when the burner is uncovered, the cup-shaped receptacle defines a protective windshield surrounding same that is quite effective. Also, the

diameter of the receptacle and lid is preferably selected to be between approximately 4 and 5 inches so that the unit stands upright on a relatively broad stable base while, at the same time, providing ample support for wide cooking vessels such as skillets and the like. The controls are simple as is the connection to the fuel cannister which calls for nothing more than the insertion of a needle into a rubber valve in the same manner as is used to inflate most air filled athletic equipment. The LP gas as used for fuel comes pre-packaged in a lightweight pressurized cannister and is already in wide use for lanterns, the larger two-burner camp stoves and tent heaters.

It is, therefore, the principal object of the present invention to provide a novel and improved miniaturized camp stove.

A second objective of the invention herein disclosed and claimed is to provide a unit of the type previously mentioned that is virtually wind and weatherproof when in use.

Another object is to provide a camp stove ideally suited for back-packers because it is not only extremely lightweight and compact, but it can also be repacked almost immediately after being used because the burner element is housed inside a covered receptacle and the latter dissipates its residual heat very quickly.

Still another objective is to provide a camper's stove of the type described that uses readily available pre-packaged LP gas as fuel, a pint can of which will last about 6 hours.

An additional object is the provision of a lightweight stove in which the burner flame is so confined and directed at the bottom of the cooking vessel that the heat losses are minimal with the result that the unit is both fast and efficient to use.

Further objects of the invention are to provide a camp stove that is easy to operate, inexpensive, of simple construction, rugged, versatile, easily serviced, safe to use and even decorative in appearance.

Other objects will be in part apparent and in part pointed out specifically hereinafter in connection with the description of the drawings that follows, and in which:

FIG. 1 is a perspective view looking down and slightly to the left at the camp stove in assembled relation ready for use;

FIG. 2 is a perspective view from the same vantage point as FIG. 1 except that the unit has been completely disassembled and stored in the container formed by the cup-shaped receptacle and lid therefor;

FIG. 3 is still another perspective view from the same position as FIGS. 1 and 2 that differs from the latter view in that the lid has been removed and set off to one side so as to reveal the manner in which the burner, gas fitting and fastener for the base are stored inside the cup-shaped receptacle;

FIG. 4 is a side elevation of the stove without a gas cannister attached thereto;

FIG. 5 is a top plan view thereof; and,

FIG. 6 is a fragmentary side elevation to an enlarged scale, substantial portions of which have been broken away and shown in diametrical section, revealing the internal construction of the gas fitting together with the connecting portions of the cup-shaped receptacle, lid and burner.

Referring next to the drawings for a detailed description of the present invention and, initially, to FIGS. 1–5, inclusive, for this purpose, reference numeral **10** has been selected to broadly designate the stove and numeral **12** to similarly denote the fuel cannister used therewith. The latter element comprises nothing more than a commercially-available can of LP gas wherein the container **14** is of the pressurizable aerosol type fitted with a rubber valve **16** in the neck **18** of the self-closing kind that accepts a hollow needle **20**. One need only insert the needle **20** into the valve **16** in the manner used to inflate footballs and the like equipped with the same type of rubber valve to release the gas under pressure into the gas fitting **22** when the flow thereof is controlled by flow-control valve **24**.

A shallow cup-shaped receptacle **26** forms the bottom of a covered hollow cylindrical container broadly designated by numeral **28** in FIG. 2, the cover for which is provided by lid **30**. It has been found that by making the container **28** with a

diameter of between approximately 4 and 5 inches and a depth of around 1-½ inches more or less, the interior thereof will easily accommodate the gas fitting **22**, the burner **32** and the fastener **34** used to hold the base-forming lid **30** onto the lower upright branch **36** of the gas fitting as revealed most clearly in FIG. **3**. These same dimensions result in the extremely compact unit shown in FIG. **2** which will fit easily into a back-pack or even a pant or jacket pocket. Furthermore, as shown in FIGS. **1** and **4**, the stove in assembled relation provides a broad stable base defined by the lid, an almost equally broad and stable support for the cooking vessel in the form of the cup-shaped receptacle **26**, and a relatively low center of gravity aided by the cannister which provides a sort of outrigger type boom or anchor that steadies the entire assembly.

The cup-shaped receptacle **26** has a central aperture **38** (FIG. **6**) therein sized to loosely receive the externally-threaded neck **40** of upstanding branch **42** of the gas fitting **22**. The interally-threaded control aperture **44** in the plate **46** that forms the bottom of the burner screws down onto the neck of the upstanding branch **42** and functions as a fastener holding the cup-shaped receptacle in place on top thereof, all of which is most clearly revealed in FIG. **6**.

Also shown in FIG. **6** is the fact that the lower branch **37** of the gas fitting is provided with an internally-threaded socket **48** adapted to receive the screw fastener **34** that passes through the control aperture **50** in the lid **30** and releasably mounts the latter in base-forming position. The lid **30** is bordered by a circumferential skirt **52** that rests upon the ground and provides the space necessary to accept the head of the fastener **34**. This screw fastener may, of course, take many forms, the particular one illustrated consisting of a simple slotted head with opposed flats **54** (FIG. **3**) ground on opposite sides so that it can be removed with the thumb and forefinger in the absence of a bladed tool. A knurled head or even a wing nut could easily be substituted for the fastener illustrated.

In FIGS. **1**, **3** and **4**, it will be seen that the cup-shaped receptacle is bordered by an integrally-formed upstanding annular flange **56** that is generally cylindrical and of substantial height, preferably at least an inch so as to project well above the surface of the burner **32** and provide a shield for the flame eminating therefrom. The upper margin of this flange is provided with at least one, and preferably two or more circumferentially elongate notches **58** which cooperate with a cooking vessel (not shown) resting on top of the stove to define slots of sufficient area to permit effective escape of the heated products of combustion and admit enough air to partially support combustion. This flange also confines and directs the flame against the underside of the cooking vessel thus preventing heat losses and conserving the fuel.

Finally, with particular reference over again to FIG. **6**, the remaining details of the gas fitting **22** will be set forth. The main section **60** of this fitting extends horizontally atop integrally formed upstanding lower branch **36** which intersects the latter at a point intermediate the ends thereof and defines a post upon which the remainder of the assembly is supported. The main section **60** has an axial bore **62** therethrough, one end **64** of which is enlarged and internally threaded to receive the valve needle **20**. As is common with all such needles, it is hollow and has a port **66** (FIG. **4**) in the side thereof through which fuel enters and is conducted on into the axial passage **62**. The opposite end of the axial passage is, likewise, enlarged, internally threaded as at **66** and **68** as well as being provided with shaft packing **70** for the stem **72** of flow control valve **24**. This valve **24** is nothing more than an axially-operated needle valve that closes against a frustoconical seat **74** formed in axial passage **62** immediately upstream of branch passage **76** that opens through the top of the main fitting section opposite lower branch **36**. Branch passage **76** extends vertically into an externally and internally-threaded tubular neck or collar **78** that is integrally formed atop the main section **60** of the fitting in axial alignment with lower branch **36**. Upstanding branch **42** actually comprises a separate tubular member in the particular form illustrated which screws onto collar or neck **78** and provides ready access to fuel jet **80** that screws into the interior of said collar. Since the port **82** in jets such as this is quite small and rather easily plugged, it is wise to provide for the removal of tubular upright **42** in order to service the jet. Two opposed holes **84** are provided in the tubular upstanding branch **42** to admit air therein and mix with the fuel exiting from the jet port **82**. The upper portion of tubular branch **42** thus forms a mixing chamber for the air and fuel.

What is claimed is:

1. The camp stove which comprises: a shallow generally cup-shaped receptacle housing a central opening therein and an upstanding annular flange containing at least one vent; a lid sized and adapted to cooperate with the cup-shaped receptacle to define a covered container; gas fitting means having a stem portion intersected intermediate its ends by a cross piece, one end of said stem portion being adapted for connection to the lid so as to produce an upstanding support with said lid functioning as a base therefor, the other end of said stem portion being hollow and terminating in a neck of reduced dimension having an upwardly-facing shoulder at the base thereof, the cross piece having an opening therethrough communicating with the hollow interior of the stem portion to define therewith an inverted T-shaped passage, said T-shaped passage including a valve seat located in one branch of the cross piece facing the other branch thereof; means carried by the branch of the cross piece having the seat therein connectable to a source of fuel; valve means carried by said other branch of the cross piece adapted upon actuation into closed position to engage said valve seat and shut off the supply of fuel to the stem portion, and said valve upon actuation into open position being adapted to unseat and permit the flow of fuel into said stem; and burner means mountable on the neck of the stem portion, said burner means functioning as a fastener to hold the cup-shaped receptacle down against the shoulder with the neck projecting up through the central opening.

2. The camp stove as set forth in claim **1** in which: the vent comprises at least one circumferentially elongate notch in the rim of the upturned flange bordering the cup-shaped receptacle.

3. The camp stove as set forth in claim **1** in which: the lid is bordered by a downturned skirt and has a centrally-located aperture therein, the portion of the stem resting atop the lid includes a threaded section, and a threaded fastener attachable to the threaded section of the stem holds the latter to the lid when one of said threaded members is passed through the aperture in the latter, the skirt bordering the lid functioning to raise the connection between the stem and fastener into a recessed position therein.

4. The camp stove as set forth in claim **1** in which: the means for connecting the gas fitting to a source of fuel comprises a hollow needle of the type adapted for insertion into the self-closing rubber valve of a pressurized fuel cannister.

5. The camp stove as set forth in claim **1** in which: the subassembly that includes the gas fitting, the valve means and the means connectable to a source of fuel is sized to fit inside the covered container defined by the lid and cup-shaped receptacle.

6. The camp stove as set forth in claim **1** in which: an orificed fuel-metering jet is located within the hollow stem portion, and said hollow stem portion contains an aperture downstream of said jet orifice and upstream of the burner that is open to the atmosphere, said jet being operative to direct fuel past said aperture so as to aspirate air therethrough in sufficient volume to support combustion.

7. The camp stove as set forth in claim **1** in which: the valve means is of the needle type adapted to cooperate with the valve seat upon relative movement therebetween to meter the flow of fuel to the burner.

8. The camp stove as set forth in claim **1** in which: the height of the upstanding flange bordering the cup-shaped receptacle is such that the burner lies recessed beneath the rim thereof.

9. The camp stove as set forth in claim 2 in which: the rim of the upstanding flange includes at least two circumferentially elongate notches arranged in angularly-spaced relation to one another, said notches cooperating with the bottom of a cooking vessel resting atop said rim to define slots sized to protect the burner flame from the wind while permitting the heated products of combustion to escape and admitting air to partially support combustion.

10. The camp stove as set forth in claim 5 in which: the burner is also sized to fit into the covered container with the stem subassembly.

11. The camp stove which comprises: a shallow generally cup-shaped receptacle housing a central opening therein and an upstanding annular flange containing at least one vent; a lid sized and adapted to cooperate with the cup-shaped receptacle to define a covered container; gas fitting means having a stem portion joined intermediate its ends by a projecting leg, one end of said stem portion being adapted for connection to the lid so as to produce an upstanding support with said lid functioning as a base therefor, the other end of said stem portion being hollow and terminating in a neck of reduced dimension having an upwardly-facing shoulder at the base thereof, the projecting leg having an opening therethrough communicating with the hollow interior of the stem portion to define therewith an L-shaped passage, means carried by the projecting leg connectable to a source of fuel; and burner means mountable on the neck of the stem portion, said burner means functioning as a fastener to hold the cup-shaped receptacle down against the shoulder with the neck projecting up through the central opening, said gas fitting means, means connectable to a source of fuel, and burner means being sized to fit inside the covered container defined by the lid and cup-shaped receptacle.

12. The camp stove as set forth in claim 11 in which: the vent comprises at least one circumferentially elongate notch in the rim of the upturned flange bordering the cup-shaped receptacle.

13. The camp stove as set forth in claim 11 in which: the lid is bordered by a downturned skirt and has a centrally-located aperture therein, the portion of the stem resting atop the lid includes a threaded section, and a threaded fastener attachable to the threaded section of the stem holds the latter to the lid when one of said threaded members is passed through the aperture in the latter, the skirt bordering the lid functioning to raise the connection between the stem and fastener into a recessed position therein.

14. The camp stove as set forth in claim 11 in which: an orificed fuel-metering jet is located within the hollow stem portion, and said hollow stem portion contains an aperture downstream of said jet orifice and upstream of the burner that is open to the atmosphere, said jet being operative to direct fuel past said aperture so as to aspirate air therethrough in sufficient volume to support combustion.

15. The camp stove as set forth in claim 11 in which: the height of the upstanding flange bordering the cup-shaped receptacle is such that the burner lies recessed beneath the rim thereof.

16. The camp stove as set forth in claim 12 in which: the rim of the upstanding flange includes at least two circumferentially elongate notches arranged in angularly-spaced relation to one another, said notches cooperating with the bottom of a cooking vessel resting atop said rim to define slots sized to protect the burner flame from the wind while permitting the heated products of combustion to escape and admitting air to partially support combustion.

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