Oct. 28, 1958 W. F. VANDERBEEK 2,857,905

CAMP STOVE

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Fig. 1

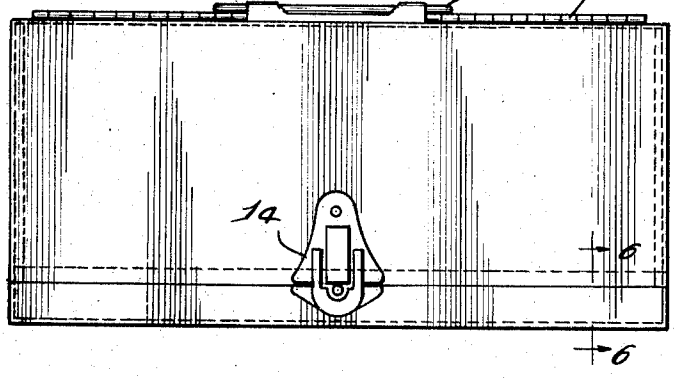


Fig. 2

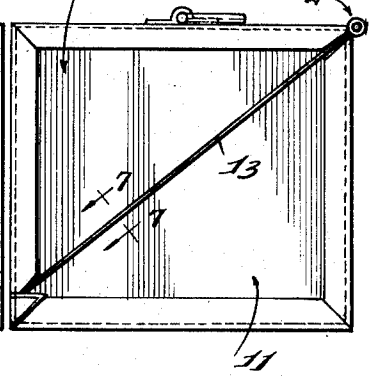


Fig. 3

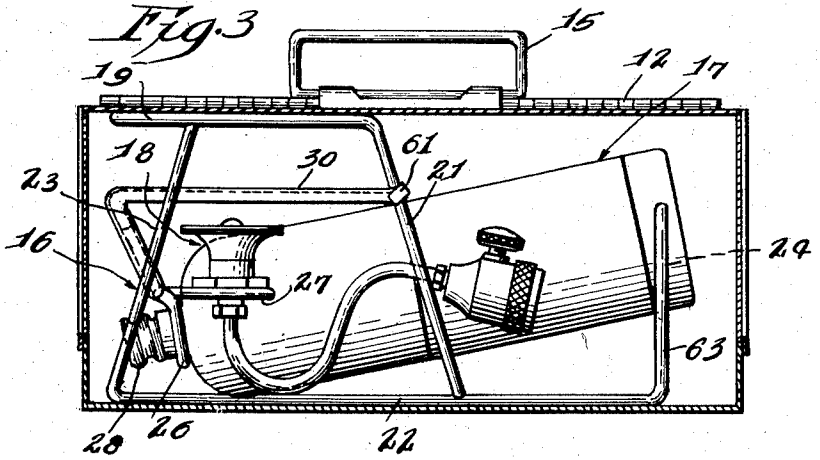


Fig. 4

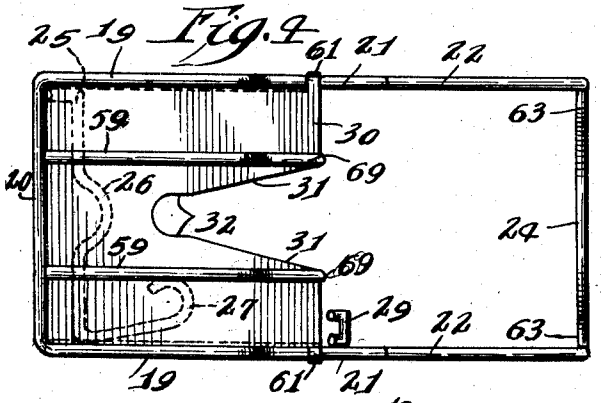


Fig. 5

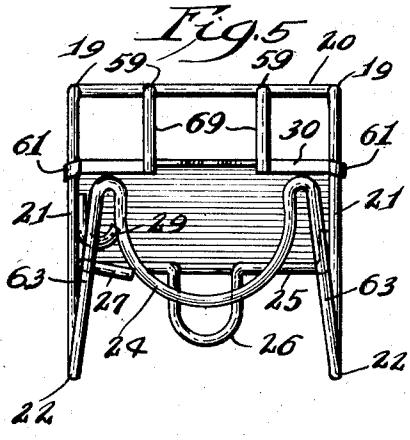


Fig. 6

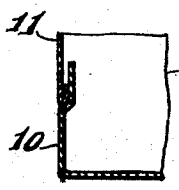
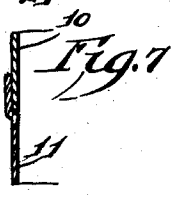


Fig. 7



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Fig. 8

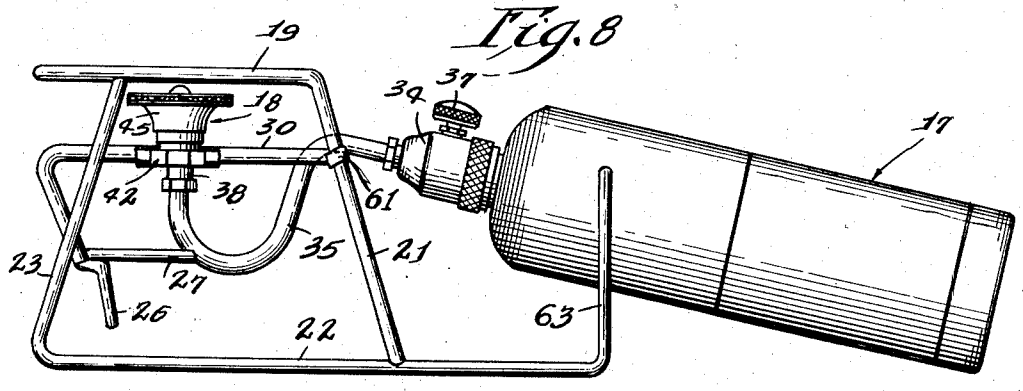
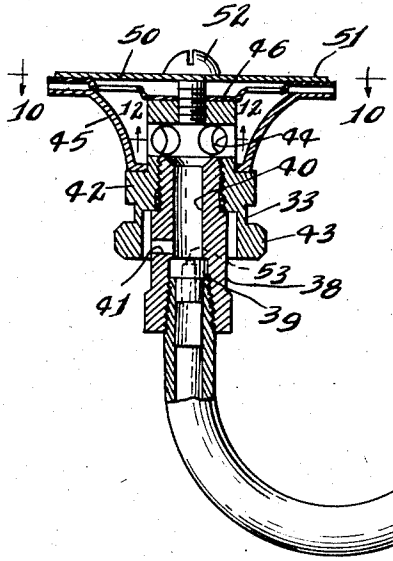


Fig. 9



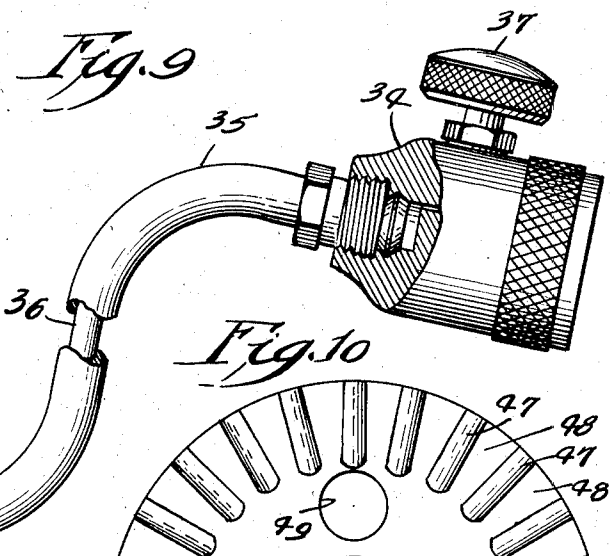


Fig. 10

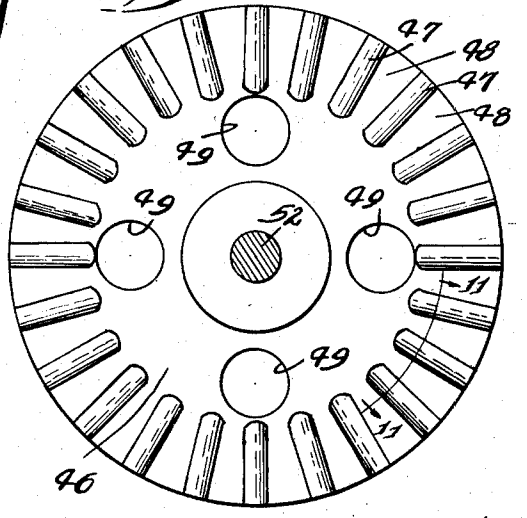
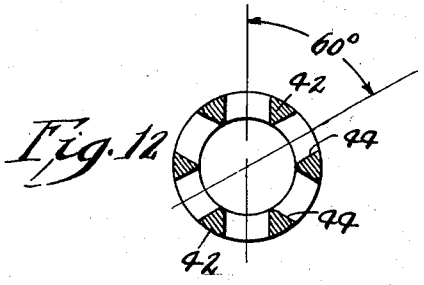


Fig. 11



Fig. 12



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CAMP STOVE

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Application October 18, 1954, Serial No. 462,798

7 Claims. (Cl. 126—38)

This invention relates to a portable stove and more particularly to a camp stove for burning liquified petroleum gases.

There are several advantages to the use of liquified petroleum gases, often referred to as L. P. gases, as a fuel in portable stoves. The resulting flame is clean and odorless. Ordinarily, the fuel is easily portable in relatively small containers which are required by I. C. C. standards to withstand the high pressures to which the gas is subjected in storage. These gases, particularly propane, will volatilize at the normal ambient temperatures one encounters in most parts of the country and, therefore, make a suitable fuel for use in practically all localities.

The portable camp stoves which have been made heretofore have serious limitations both in use and in practicality for several reasons. Ordinarily, the stoves have been built into metal suitcase-like containers with the stove parts in one half of the container and the other half serving as a windshield. Foldable side panels have also been used so that ordinarily a three-sided enclosure about the grate of the stove is provided. The fuel containers and their connections have usually been stored within the suitcase and require considerable manipulation to set up or take down the stove. Due to the structure of the stove, there has been a serious limitation upon the size of pan or kettle that could be placed on the stove, and particularly to place it so as to be centered upon the burner. Irregularities in burning characteristics have also been experienced primarily because of the structural relation of the burner and fuel supply. The present structure presents a new and improved portable stove which overcomes the difficulties enumerated above.

It is, therefore, the primary object of this invention to provide a new and improved portable stove.

Another object of the invention is to provide a stove for burning L. P. gas and at the same time provide a maximum heating in the shortest interval of time from starting.

A further object is to provide a portable stove which will maintain at all times an even and uniform flame of consistent characteristics.

A further object is to provide a stove easily and quickly convertible from a portable storage condition to one of use.

Another object is to provide a portable stove of such structure that the stove and carrying case are separate parts and the case is so constructed as to serve as a windshield for the stove.

A preferred embodiment of the present stove structure is illustrated in the accompanying drawings in which:

Figure 1 is a front elevational view of the case for the stove;

Figure 2 is a side elevational view of said case;

Figure 3 is a front elevational view of the case with the front removed, showing the stove stored therein;

Figure 4 is a top plan view of the frame of the stove;

Figure 5 is an end elevational view of the stove looking from the righthand side of Figure 4;

Figure 6 is a fragmentary sectional view through the carrying case taken substantially along line 6—6 in Figure 1;

Figure 7 is a fragmentary sectional view along line 7—7 in Figure 2;

Figure 8 is a side elevational view of the stove assembled for use;

Figure 9 is a side elevational view of the burner structure and associated parts, partly in section to show the interior structure thereof;

Figure 10 is a horizontal sectional view along line 10—10 in Figure 9 showing the corrugated disk of the burner in plan;

Figure 11 is a fragmentary sectional view through the corrugated disk taken substantially along line 11—11 in Figure 10; and

Figure 12 is a horizontal sectional view taken substantially along line 12—12 in Figure 9.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail an illustrative embodiment of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

In general, the stove and the carrying case are separate with the stove including a substantially rigid frame formed from a wire or rod material, a portable container for L. P. gas and a burner structure which can be attached to the gas container. The carrying case is generally about 5 in. square by 10 in. long and the stove frame fits fairly snugly within the container when in storage position. The burner structure, including the gas container and the burner itself, fits within the wire frame of the stove. The complete portable stove is thus a small unit when stored for carrying.

Referring particularly to Figures 1 to 3, it will be noted that the carrying case is of generally square design having a top 10 and bottom 11 hinged together by a piano-type hinge 12. The top and bottom halves of the carrying case are similar so that the juncture line 13 between the halves extends diagonally across the ends on about a 45° angle. A suitable clasp 14 is provided for securing the parts together and a bail handle on the top half may be used for conveniently carrying the stove. The carrying case is constructed as above described so that it may be used as a wind screen about the stove. The two halves of the case may be opened relative to each other and set on end in any position about the stove as is desired. Thus, it can be visualized that the carrying case is actually a portable screen for the stove, movable at will about the stove itself since it is not connected thereto.

The stove itself includes only three parts as far as the owner is concerned. These parts include a substantially rigid rod or wire formed frame 16, a portable container 17 for L. P. gas, and a burner structure 18. The manner in which these items are stored within the case is illustrated in Figure 3, the gas container 17 and burner structure 18 both being stored within the wire formed frame of the stove in turn placed within the case.

The frame of the stove includes a base upon which the stove may be placed for use along with an integrally formed grid and the necessary structure for securing the burner and gas supply within the frame. It will be noted in Figures 4 and 5 that the wire frame includes two outside horizontally disposed and parallel extending wire members 19 connected by horizontal arm 20 and two in-

side horizontal members **59** disposed between and parallel to the members **19**, these members comprising the grid. The outside members **19** are extended downwardly providing a slanting leg **21** connected at its base to horizontal runners **22**, forming a base pedestal for the frame. The runners at the front of the stove have upwardly extending legs **23** joined to the grid side members **19**, thus providing a four-legged stand with the legs **21** for the grid structure. At the opposite end of the frame, the runners **22** are turned upwardly forming inwardly directed legs **63** and an integral, upwardly open, vertically extending, C-shaped saddle portion **24** so shaped as to receive and grip the gas bottle container **17**.

The position occupied by the stove particularly when in storage position (Figure 3) is accomplished by some auxiliary rigid wire members placed in the stove frame to receive the parts of the stove. One of these members **25** extends across the front of the stove between the legs **23** and includes a loop-shaped portion **26** at the center of the frame and a hook-shaped bracket **27** at the side of the frame. It will be noted in Figure 3 that the loop shaped bracket **26** receives the nipple **28** of the gas bottle **17** with the rearward or bottom portion of the bottle placed in the saddle **24**. The hook-shaped bracket **27** cooperates with a small U-shaped bracket **29** secured to the leg **21** so as to receive cooperatively the burner structure **18**. When the stove is in use, these auxiliary brackets are not utilized except for the saddle **24** which is always used to hold the gas bottle. The burner structure is formed so that the burner, its pipeline and the valve used to connect it to the gas bottle is a non-flexible unit. Thus, when the burner structure is attached to the gas bottle there is a single non-flexible unit formed. This non-flexible characteristic is used for placing and securing the gas bottle and burner in the stove frame. A substantially horizontal plate **30** is installed in the frame immediately below the grid and has its forward edge connected to the legs **21** at **61** and to the grid members **59** by inclined members **69**. The trailing edge of the plate **30** is inclined downwardly and is carried on the member **25**. This plate has a central slot formed with diverging side walls **31** which narrow to parallel sides **32** near the center of the plate. The burner structure is provided with an annular groove **33** of a size to fit easily but snugly between the parallel sides **32** of the slot in the plate. Thus, by merely sliding the burner structure into the slot in the plate so that the parallel sides **32** engage in the annular slot **33**, a connection between the burner and plate is made. Since the burner to gas container connection is non-flexible the container may then be placed in the saddle **24** as illustrated in Figure 8, firmly securing the burner and container in the stove frame. The C-shaped saddle is so proportioned as to require a downward force on the gas container to snap it into the saddle. A tight friction grip is thus provided and the burner will not tip because of the inter-relation of the slot in the plate and the annular groove about the burner base.

The burner of the present stove is specially constructed to avoid excessive heating of the burner parts while the stove is in use. It has been found that heat to the burner parts may cause expansion of the metal as would be expected, however, the burner's characteristics are often changed because of the use of an orifice through which the gas fuel must pass and changes occurring in the size of this orifice. The burner structure which minimizes the heating of the orifice block and other burner parts is illustrated in Figure 9. A needle valve **34** is connected to a gas supply line **35** equipped with the usual filler rod **36**. The needle valve has a thumb screw **37** for control and is internally threaded so as to be easily placed on the gas container **17**. The gas container is provided with a self-sealing valve as prescribed by regulations. This valve is only opened when the needle valve structure **34** is placed on the nipple **28** of the gas container.

The burner itself is mounted upon the end of the connecting line **35**. A hollow core **38** is screw threaded upon the gas line and holds the orifice block **39** over the end of the gas line. A central bore **40** is utilized as a mixing chamber, air being directed into the bore through a plurality of radial openings **41**. A fitting **42** is threaded upon the core and has in its periphery the aforementioned annular slot **33** for mounting the burner as well as wrench flats **43**. This fitting is provided with a plurality of radial openings **44**, better illustrated in Figure 12, for conducting the gas and air mixture into the interior of the bell housing **45** of the burner itself. A long and a short flame is produced at the periphery of the bell housing by the use of a pair of disks mounted over the housing and closing the upper end thereof. The inner disk **46** is illustrated in Figure 10 and includes a corrugated periphery having lands **47** and grooves **48** for conducting the fuel mixture to its periphery. Four openings **49** inside the periphery conduct gas to the upper side of the corrugated disk. A flat disk **50** extends over the corrugated disk with its periphery **51** short of the periphery of the corrugated disk. Both disks are held in place by a screw **52** threaded into the fitting **42**. In operation, the gas mixture is formed within the bore **40** of the core. This mixture is conducted into the bell housing where part of it passes under the disk in the grooves formed by the lands and another part passes through the openings **49** to the upper side of the disk and then outwardly through the grooves **48**. The underside grooves produce long flames. The upper grooves produce short flames at the periphery of the flat disk **50** and because of the relation of the disks, all of the burning occurs at the periphery of the burner structure. Considerable heat dissemination occurs between the flames and the orifice block **39** so that no appreciable change in the size of the orifice **53** actually occurs.

The burner is caused to produce a uniform and even heat by insuring that only fuel in the gaseous state is conducted to the burner. No liquid passes out of the container **17**. This is accomplished by so arranging the plate **30** and saddle **24** to hold the assembled burner structure and gas container in the stove frame in the position illustrated in Figure 8. It will be noted that the gas container is sloped upwardly toward the burner. These containers when filled with L. P. gas are not actually filled with liquid as considerable vapor space must be maintained within the container at all times. By the tilting arrangement, which preferably is about 13° from horizontal, only gas passes through the needle valve and into the gas line **35**.

With the present structure, a portable stove is provided which may be easily and quickly assembled and disassembled. The carrying case is relatively small and is provided with a structure suitable for forming a windshield for the stove. It may be placed in any position about the stove since it is not attached thereto. Additionally, any size container may be placed on the grid of the stove as the windshield will not interfere.

I claim:

1. A portable stove comprising: an elongated substantially rigid wire formed frame including a grid at one end and a saddle at the opposite end; a burner support plate secured in the frame below the grid; a gas burner secured in the support plate so as to direct flame upwardly through the grid; a non-flexible gas conduit rigidly secured to the burner and extending rearwardly of the frame toward said saddle; a liquified petroleum gas container having an outlet nipple rigidly connected to said conduit whereby to hold the container and conduit against movement one relative to the other, said saddle gripping said container and said burner support plate gripping the burner to support the burner and container as a unit

therebetween, said gas conduit, said burner support plate and said saddle cooperating to position the container outlet nipple above the level of the fluid in the container so as substantially to admit only fuel vapor into the gas conduit.

2. A portable stove, comprising: a stove frame formed of a rod material having a base and a grid in elevated position over the base; a burner supporting plate beneath the grid; a non-flexible curved gas line having a valve body on one end and a burner on the opposite end; a gas bottle having a nipple removably connected to said valve body so as to secure the bottle and burner together as a non-flexible unit; and a saddle formed on said frame and spaced from the grid to clamp upon the gas bottle adjacent the nipple concurrently with supporting of the burner on said plate, said curved gas line, plate and saddle being positioned and arranged cooperatively to hold the burner upright and the gas bottle inclined upwardly toward the burner to position the nipple above the level of fluid therein and admit only fuel vapor to said gas line.

3. A portable stove as specified in claim 2 wherein the burner is provided with an annular groove below its fuel burning level and the burner supporting plate is provided with an open-ended slot to be slidingly received in said groove to hold the burner upright.

4. A portable camp stove, comprising: a substantially rigid wire formed stove frame adapted to carry fuel supply and burning apparatus therewithin, said frame having a grid, a horizontal burner support plate secured in the frame end below and generally parallel to the grid and an upstanding C-shaped saddle spaced from the grid; a burner unit including a non-flexible curved gas line having a burner on one end and a valve on the opposite end, a gas supply bottle having an outlet nipple at one end removably connectable to said burner unit, said bottle and burner unit forming a non-flexible unit when connected with the burner and the end of said bottle adjacent said nipple respectively adapted to be gripped in said burner support plate and saddle with the bottle being inclined so that the outlet nipple is positioned above the level of fluid in the bottle, with the bottle being inclined so that the outlet nipple is positioned above the level of fluid in the bottle.

5. A portable stove, comprising, in combination, a gas burner and a cylindrical LP gas container having a bottom and an outlet end connected to the burner by a conduit, an open frame formed of rod material including, a pair of spaced apart horizontal runners extending along the sides of the frame and for the length thereof, a grid positioned above an end of the runners and overlying a part of their length, a plurality of legs extending generally vertically upward from the runners connecting the grid thereto, and an upwardly open generally C-shaped saddle extending transversely in an elevated position between the other ends of the runners at a distance from the grid for receiving and holding the container adjacent the outlet end thereof in an elevated position relative to the runners and at a level beneath the grid, a horizontally disposed burner support plate extended between said legs and positioned beneath the grid, and means defining a slot in said plate opening towards the saddle for slidably receiving the gas burner when the container is in said saddle.

6. A stove as defined in claim 5, in which, with the burner positioned in said burner plate, the burner plate and saddle are positioned and the conduit so shaped as to have the container upwardly inclined towards its outlet end, and means detachably connecting the burner and conduit to the container.

7. A portable stove, comprising, in combination, a gas burner and a cylindrical LP gas container having a bottom and an outlet end connected to the burner by a conduit, an open frame formed of rod material including, a pair of spaced apart horizontal runners extending along the sides of the frame and for the length thereof, a grid positioned above the runners at one end of the frame, a plurality of legs extending upwardly from the runners and connecting the grid thereto, and an upwardly open generally C-shaped saddle extending transversely between the runners at a distance from the grid for receiving and holding the container adjacent the outlet end thereof at a level beneath the grid, a horizontally disposed burner support plate extended between said legs and positioned beneath the grid, and means on said plate for holding the gas burner when the container is in said saddle, said plate being positioned above the runners a distance greater than the diameter of the container.

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