Sept. 9, 1930. O. HORSRUD ET AL 1,775,165

CAMP STOVE

Filed March 21, 1928 2 Sheets-Sheet 1

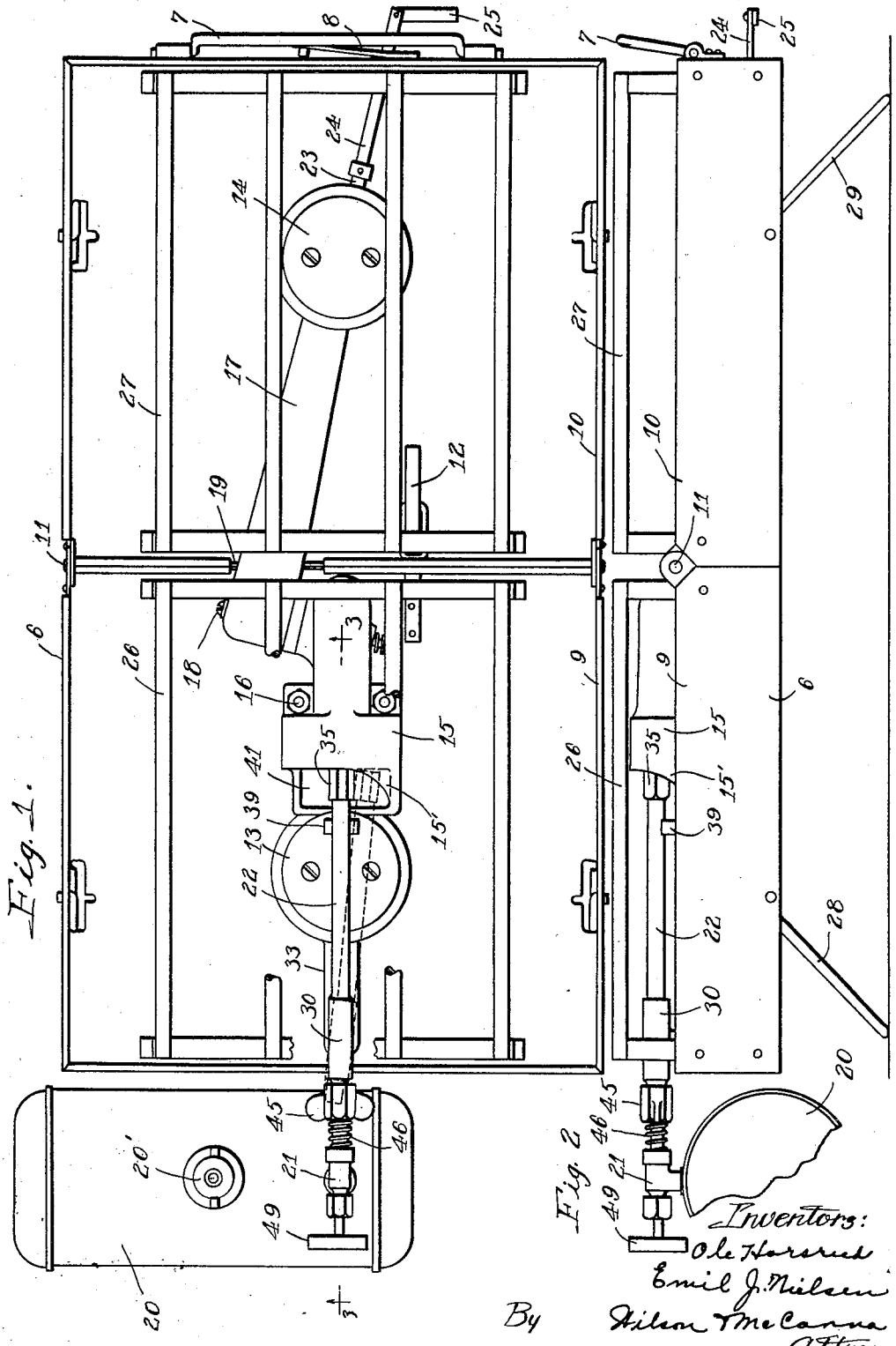


Fig. 1.

Fig. 2

Inventors:
Ole Horsrud
Emil J. Nilsen
By Wilson McCanna
Attys.

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Fig. 5

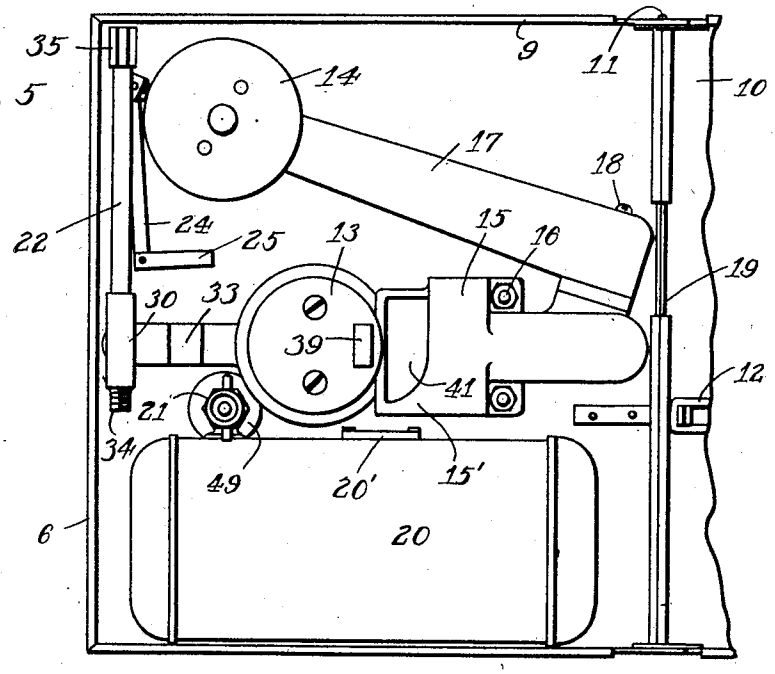


Fig. 3.

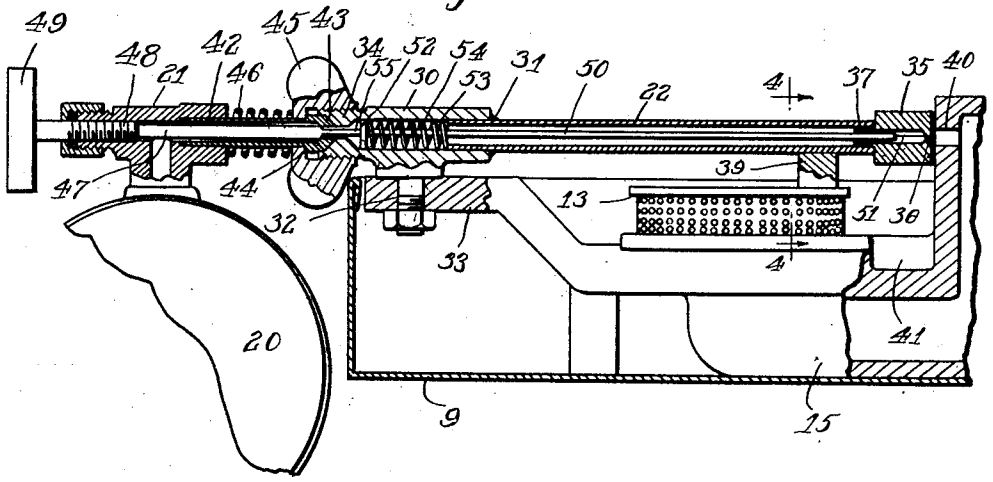
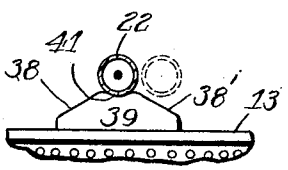


Fig. 4



Inventors:
Ole Horsrud
Emil J. Nilsen
By Nilson & McCanna
Attys.

Patented Sept. 9, 1930 1,775,165

UNITED STATES PATENT OFFICE

OLE HORSRUD, OF CHICAGO, AND EMIL J. NIELSEN, OF ROCKFORD, ILLINOIS

CAMP STOVE

Application filed March 21, 1928. Serial No. 263,399.

This invention relates to improvements in camp stoves.

The principal object of our invention is to provide a camp stove of extremely simple and durable construction, as well as one which can be set up for use with considerable ease and facility and is arranged to fold up to extremely small size, considering that the stove affords two or even three burners.

Among the features incorporated in our stove are the following:

(1) The provision of a pivoted fuel-vaporizing tube arranged to be swung to an inoperative out of the way position in the folding of the stove to permit the closing of the case, as well as to facilitate the stowing of the various parts of the stove into the case, and arranged to be swung to operative position over the master burner in relation to which the same is pivoted.

(2) The provision of a fuel tank having means for making a quickly attachable and detachable connection with the fuel-vaporizing tube, thus making the tank a unit separable from the rest of the stove to facilitate the matter of filling the same, besides making it handier to stow in the case.

(3) The provision of a cleaning rod permanently assembled in the fuel-vaporizing tube arranged to be operated to probe the small orifice through which the fuel is delivered into the burner manifold, thus insuring against likelihood of the same becoming clogged and interfering with the good operation of the stove. The cleaning rod, as hereinafter described, is preferably operated automatically in the coupling of the fuel tank with the vaporizing tube, suitably by a projecting nib on the needle valve which controls the discharge of fuel from the tank into the vaporizing tube, the parts being so related that when the tank is coupled to the tube the nib on the valve forces the cleaning rod to enter and clean out the discharge orifice and thereafter when the valve is opened for the discharge of fuel from the tank the movement of the valve is enough to allow the cleaning rod to be retracted from the discharge orifice and hence permit the free flow of fuel therethrough.

The invention is more fully described hereinafter in connection with the accompanying drawings wherein—

Figure 1 is a plan view of a camp stove embodying our improvements;

Fig. 2 is a side view;

Figs. 3 and 4 are sections taken on the lines 3—3 and 4—4 of Figs. 1 and 3, respectively; and

Fig. 5 is a plan view of part of the case indicating how the parts are arranged to be stowed therein in the folding of the stove for transportation.

The same reference numerals are applied to corresponding parts throughout the views.

The stove illustrated conforms somewhat to that shown in our Patent 1,654,662, issued January 3, 1928, and comprises a carrying case 6 equipped with a handle 7 to be carried like a suitcase, when the case is folded and locked suitably by a leaf spring latch represented at 8. The case comprises a main section 9 and a cover section 10 hinged together, as at 11, and arranged to be held in coextended relation by a toggle latch 12, as described in our patent above referred to. Thus, the case serves as a stove base for burners 13 and 14. The former constitutes a master burner and has its manifold 15 bolted, as at 16, to the bottom of the case section 9. The burner 14 is a dependent or auxiliary burner and has its manifold 17 pivoted to the manifold 15 at 18 to permit the same to be swung from the folded inoperative position shown in Fig. 5 to the extended operative position shown in Fig. 1, the case sections being cut away, as at 19, to permit the extension of the manifold 17 from case section 9 into section 10. Where three burners are employed, as illustrated in our patent above mentioned, the third burner is formed preferably on a manifold common to two burners, and is arranged to occupy a position in line with the burners 13 and 14 and approximately midway therebetween. The burners, generally stated, are supplied with fuel from the usual tank 20 through a valve 21 and fuel-vaporizing tube 22. Where two burners are employed the valve 21 controls the supply for both burners but it is possible to control the burner 14

individually by means of a valve 23 operated, as described in our patent above mentioned, by means of a pair of links 24 and 25 which constitute a foldable handle extensible through an opening in the wall of the case. Where three burners are employed the middle burner is preferably the master burner and valves corresponding to the valve 23 are provided for each of the burners. In either event, the fuel supplied to the master burner during normal operation is vaporized by passage through the vaporizing tube 22 directly over the master burner. Grates 26 and 27 fit in the case sections 9 and 10, respectively, and provide supports for pans or kettles placed over the burners, these grates being arranged to be stowed in the case section 10 when the stove is folded up. Legs 28 and 29, as described in our patent above referred to, are foldable from the extended operative position shown in Fig. 2 to an inoperative position lying flush alongside the case and out of the way. Thus, the camp stove, generally stated, conforms to that shown in our patent and no invention is claimed in the details thus far described excepting only insofar as the same form a part of novel combinations and arrangements as hereinafter set forth.

The fuel-vaporizing tube 22, according to the present invention, is pivoted with respect to the master burner 13 to be swung from an inoperative out of the way position, as shown in Fig. 5 where all parts thereof are within the case section 9 so as to permit the closing of the case, to the operative position shown in Figs. 1–3 where the tube extends over the master burner and has the fuel intake end thereof projecting from the case for easy connection with the fuel tank. The tube 22, which is preferably of copper to minimize corrosion, is soldered to a fitting 30, as indicated at 31, the latter being pivotally secured by means of a stud 32 to a bracket 33 suitably cast integral with the manifold 15 of the burner 13. The fitting 30 has a screw-threaded neck portion 34, which, in the operative position of the vaporizing tube, is arranged to project from the case for connection with the fuel tank 20 in a manner presently to be described. A nozzle 35 having a pin-hole orifice 36 for the delivery of vaporized fuel into the manifold 15 has a reduced neck portion 37 having a drive fit in the end of the tube 22. When the fuel-vaporizing tube is swung toward the operative position it is caused to ride up an inclined face 38 on a cam 39 carried on top of the burner 13, and when the orifice 36 is directly in register with the fuel intake opening 40, provided in the manifold 15, the tube drops at the same instant into a slight depression 41 formed in the peak of the cam 39, the flexibility in the tube itself being relied upon to retain the tube yieldingly in its operative position. When the camp stove is just being set up and the burners are, of course, cold, the vaporizing tube, after being connected with the fuel tank, is arranged to be moved to the dotted line postiion represented in Figs. 1 and 4 to permit the discharge of raw fuel into a cavity 41, the liquid fuel discharged under pressure against the blank wall of the manifold being arranged to trickle down into the cavity in a manner believed to require no explanation. The manifold 15 of the burner 13 is preferably cast with a web 15′ (see Fig. 1) over and at one side of the cavity 41 under which the nozzle 35 is arranged to be swung as shown, this web serving as a shield to prevent the loss of fuel by splashing. When sufficient fuel has been discharged into the cavity the vaporizing tube will, of course, be swung back to operative position and the cam 39, for this purpose, has an inclined face 38′, corresponding to the inclined face 38, over which the tube 22 will ride before entering the depression 41. The fuel in the cavity 41, when ignited, serves to heat up the burner, manifold, and vaporizing tube sufficiently to permit lighting at least the master burner, as is well known in the art, and, of course, the auxiliary burner or burners can be lit afterwards when there is an adequate supply of vaporized fuel.

The valve 21, previously referred to, is in the form of a T-fitting in the top wall of the tank 20 with the usual supply pipe extending therefrom downwardly into the tank to a point near the bottom thereof, in the usual manner, so that fuel may be discharged from the tank under pressure. A valve 20′ is provided on the tank for charging the same with compressed air, as by means of the usual hand pump. The body of the valve 21 has a nipple 42, sweat-soldered or otherwise suitably secured therein, and projecting therefrom. The nipple 42 has an enlargement at the free end thereof, as shown at 43, so that an annular shoulder is presented at 44 against which a gland nut 45 arranged to thread on the neck 34 is arranged to jam to cause the wedging engagement of the tapered end of the nipple into the counterbored end of the neck 34 for a fluid and pressure-tight connection. The gland nut 45 is formed with wings thereon to facilitate tightening thereof by hand. Thus, the tank can be connected or disconnected with considerable ease and facility. The coiled compression spring 46, provided on the nipple 42 and acting against the back of the nut 45, serves to hold the nut 45 against jingling about on the nipple when the tank is disconnected from the vaporizing tube and is stowed in the case and also facilitates the matter of connecting the tank with the tube by holding the nut extended for quick connection with the neck 34. The valve stem 47, which is threaded in the body of the valve as at 48, and has an operating handle 49 on

the projecting end thereof, normally closes the orifice in the outer end of the nipple when the tank is disconnected from the vaporizing tube and is stowed in the case. It will be evident that the construction just described is a very simple and practical one and greatly facilitates the handling of the stove. It is also worthy of mention that with this construction the carrying case sections can be made quite shallow, consistent, of course, with providing enough room for the storing of the parts of the stove therein, and hence a certain saving in cost is realized.

In the operation of camp stoves there has, in the past, been considerable difficulty in keeping the nozzle orifice clear of grit or carbon, and many stoves gave poor performance in service largely as a result of the fact that there was no way of insuring that the user would take the precaution of cleaning out the orifice now and then. According to our invention we provide a cleaning rod permanently assembled inside the vaporizing tube and so arranged that it will be operated to clean out the orifice every time the stove is set up for use, thus insuring good performance at all times. The cleaning rod is shown at 50 in Fig. 3 and has a needle 51 on the working end thereof arranged to pass through the orifice 36 when the rod is operated. A head 52 formed on the other end of the rod 50 is in the nature of a spider so that fuel will have free passage past the same through the bore 53 of the fitting 30 in which the head is slidably received. A coiled compression spring 54 acts between the head 52 and the end of the tube 22 normally to urge the cleaning rod 50 toward retracted position so as to withdraw the end of the needle 51 from the orifice 36, or at least partially withdraw the same sufficiently to permit the free discharge of fuel from said orifice. The stem 47 of the valve 21 has a nib end 55 projecting through the nipple orifice and sufficiently beyond the end of the nipple to engage and move the head 52 when the tank is coupled with the vaporizing tube. It will be evident that at the time the tank is being coupled with the vaporizing tube the valve 21 is closed. Hence, when the valve is opened for the discharge of fuel through the vaporizing tube the nib end 55 of the valve stem is retracted from the head 52 and the cleaning rod 50 is thus allowed sufficient movement to withdraw, or at least partially withdraw, the needle 51 from the orifice 36 so that the free discharge of fuel from the tank and thence from the vaporizing tube is permitted. It will be evident that with the means just described insuring free unobstructed flow of fuel at all times, there is every reason to expect the stove to give good performance in service so long as the user exercises ordinary care in the handling thereof. It is not necessary to provide a cleaning rod as a separate part to be carried about with the stove and which is always apt to be mislaid or lost, nor is it necessary to even make reference in the instructions accompanying the stove to the necessity for cleaning the discharge orifice inasmuch as the user is bound to take care of this matter every time the stove is set up, and, as a matter of fact, every time the valve 21 is opened and closed, for use.

It is believed the foregoing description conveys a clear understanding of our invention and of the various advantages the present stove offers over those heretofore available. It should be understood that while reference has been made in the foregoing description to specific details of construction or arrangement the same might be modified without necessarily departing materially from the invention and for that reason the appended claims have been drawn with a view to covering all legitimate modifications, adaptations and variations which may occur to those skilled in the art to which this invention relates.

We claim:

1. In a camp stove, the combination of a carrying case arranged to provide a burner support, a burner thereon, a fuel-vaporizing tube pivotally mounted relative to the burner to swing from an inoperative position wholly within the case to an operative position over the burner and with a portion thereof projecting from the case, and a fuel tank connected with said tube for delivering fuel thereto.

2. A camp stove as set forth in claim 1 wherein the burner has the manifold thereof formed with a projecting boss portion provided with a fuel intake opening to receive fuel from the discharge end of said vaporizing tube, and wherein said manifold has a liquid fuel cavity formed therein below the fuel intake opening, and is further formed to provide a shield portion at one side of the fuel intake opening over said cavity, into which said tube is arranged to be directed for the discharge of liquid fuel into the aforesaid cavity.

3. In a camp stove, the combination of a carrying case arranged to provide a burner support, a burner thereon, a fuel-vaporizing tube pivotally mounted relative to the burner to swing from an inoperative position wholly within the case to an operative position over the burner and with a portion thereof projecting from the case, a fuel tank connected with said tube for delivering fuel thereto, and means for quickly releasably holding the vaporizing tube in its operative position.

4. A camp stove as set forth in claim 3 wherein the last mentioned means comprises a cam fixed relative to the burner having a recess for receiving a part of the tube in the operative position thereof, said cam having an inclined approach at one side of said recess over which the tube is arranged to be

caused to ride to reach said depression in the movement thereof from inoperative to operative position.

5. A camp stove as set forth in claim 3 wherein the last mentioned means comprises a cam fixed relative to the burner and having a depression in the face thereof for receiving a part of the tube in the operative position thereof, said cam being formed to provide inclined approaches leading to said depression from both sides thereof, said tube being arranged to ride on one of said approaches to reach said depression in the movement thereof from inoperative to operative position and being arranged to swing past the operative position for the purpose herein set forth, the other approach serving in the latter case to guide the tube to the depression in the swinging thereof back to operative position.

6. In a camp stove, the combination of a carrying case arranged to serve as a burner support, a burner mounted thereon, a fuel-vaporizing tube pivotally mounted for swinging movement relative to the burner from an inoperative position, in which the same is disposed wholly within the case, to an operative position, in which the same extends over the burner and has the fuel intake end thereof projecting from the case for easy connection with a fuel tank, and a fuel tank having a fuel discharge fitting thereon, the latter having means arranged to make quickly attachable and detachable connection with the fuel intake end of said vaporizing tube.

7. A camp stove as set forth in claim 6 including a cleaning rod for the fuel-vaporizing tube, and means whereby the latter is operable in the connection of the fuel discharge fitting with said tube.

8. A camp stove as set forth in claim 6 including a cleaning rod assembled within the fuel-vaporizing tube having a part arranged to probe the discharge orifice of said tube to clear the same, spring means normally holding the cleaning rod in retracted position, and means arranged in the connection of said fitting with said tube to automatically operate the cleaning rod against the action of the spring means to clean out the discharge orifice.

9. In a camp stove, the combination of a carrying case arranged when opened to provide a stove base, a burner fixedly mounted therein, a fuel-vaporizing tube pivotally mounted relative to the burner to swing from an inoperative position, in which the same is disposed wholly within the confines of the case so that the case may be closed thereon, to an operative position, in which the same extends over the burner so as to be heated thereby and has the fuel intake end thereof extending over and beyond an adjacent side wall of the case for easy connection with a fuel tank, and a fuel tank having a fuel discharge fitting thereon provided with means for making a quickly attachable and detachable connection with the fuel intake end of said vaporizing tube.

10. A camp stove as set forth in claim 9 including a bracket fixed relative to the burner and extending therefrom to provide a support whereon the fuel-vaporizing tube is pivotally mounted, said mounting insuring a predetermined relationship between the tube and the burner in the operative position and also insuring the proper disposition of the discharge end of the tube relative to the fuel intake opening in the manifold of said burner.

11. A camp stove comprising, in combination, a case arranged to serve as a burner support, a burner mounted therein, a fuel-vaporizing tube pivotally mounted relative to the burner to swing from an inoperative position, in which the same is disposed wholly within the confines of the case so that the case may be closed thereon, to an operative position, in which the same extends over the burner and has a screw threaded part thereof projecting from the case for easy connection with a fuel tank, and a fuel tank having means arranged to make quickly attachable and detachable connection with said screw threaded part, said means comprising a nipple, a gland nut rotatably mounted thereon and provided with wings to facilitate turning the same by hand to thread the same on the aforesaid screw threaded part, and spring means normally holding the gland nut extended relative to the nipple for quick and easy connection with the screw threaded part.

12. In a camp stove, the combination of a carrying case arranged to serve as a burner support, a burner mounted thereon, a fuel-vaporizing tube extending over the burner and arranged to discharge into the manifold thereof, a fuel tank having a fuel discharge fitting thereon, the latter having means arranged to make quickly attachable and detachable connection with the fuel intake end of said vaporizing tube, a cleaning rod for the fuel-vaporizing tube arranged to probe the discharge orifice of said tube at the end remote from the connection to clear the same, and means arranged to be brought into engagement with said rod incidentally in making the connection of the fuel discharge fitting with said tube, whereby to operate the rod automatically.

13. In a camp stove, the combination of a carrying case arranged to serve as a burner support, a burner mounted thereon, a fuel-vaporizing tube extending over the burner and arranged to discharge into the manifold thereof, a fuel tank having a fuel discharge fitting thereon, the latter having means arranged to make quickly attachable and detachable connection with the fuel in-

take end of said vaporizing tube, a cleaning rod assembled inside the fuel-vaporizing tube having a part arranged to probe the discharge orifice of said tube to clear the same, spring means normally holding the cleaning rod in retracted position, and means arranged in the connection of said fitting with said tube to automatically operate the cleaning rod against the action of the spring means to clean out the discharge orifice.

14. In a camp stove comprising a carrying case constituting a burner support, the combination of a burner mounted in said case, a fuel-vaporizing tube extending over the burner and arranged to discharge into the manifold thereof, said tube having its fuel intake end projecting toward one side of the case for connection with a fuel tank outside the case, a fuel tank having a fuel discharge fitting thereon, the latter having means arranged to make quickly attachable and detachable connection with the fuel intake end of said vaporizing tube, a cleaning rod reciprocably mounted inside said rod having one end arranged to be passed through the discharge orifice of the tube to clean the same, a head portion at the other end of said rod in the nature of a spider to guide the rod in the reciprocation thereof, a compression spring acting against the back of the head normally to hold the rod in retracted position, there being a valve in the fuel discharge fitting on the fuel tank arranged to cut off the discharge therefrom, and an extension on said valve arranged in the connection of the fuel discharge fitting with the tube to engage the head on the cleaning rod to move the latter, the said extension being retracted in the opening of said valve and thereby permitting the cleaning rod to move to retracted position.

15. In a camp stove, the combination of a carrying case constituting a burner support, a burner thereon, a fuel-vaporizing tube pivotally mounted relative to the burner to swing from an inoperative position alongside a side wall of the case to an operative position extending over the burner and with the fuel intake end thereof projecting toward the same side wall of the case for connection with a fuel tank outside the case, and a fuel tank having a fuel discharge fitting thereon, the latter having means arranged to make quickly attachable and detachable connection with the fuel intake end of the fuel-vaporizing tube.

16. In a camp stove, the combination of a carrying case constituting a burner support, a burner mounted thereon, a fuel-vaporizing tube extending over the burner and arranged to discharge into the manifold thereof, said tube having a fuel intake fitting on the fuel intake end thereof pivotally mounted relative to the burner to swing from a position wholly within the case to a position where a portion thereof projects from the case, and a fuel tank detachably connected with said fitting for delivering fuel to the vaporizing tube.

17. In a camp stove comprising a carrying case constituting a burner support, the combination of a burner mounted thereon, a fuel-vaporizing tube pivotally mounted relative to the burner and extending over the latter normally to discharge through an opening provided in the wall of the manifold thereof, said manifold having a liquid fuel cavity provided thereon below the fuel intake opening, the fuel-vaporizing tube being arranged to be shifted from the normal operative position by swinging movement on its pivot to permit discharge against the blank wall of the manifold instead of through the opening therein whereby to supply raw fuel to the liquid fuel cavity, and a fuel tank connected with the fuel intake end of said tube for delivering fuel thereto.

18. In a camp stove comprising a carrying case constituting a burner support, the combination of a burner mounted thereon, a fuel-vaporizing tube pivotally mounted relative to the burner to swing from an inoperative position to an operative position extending over the burner with the fuel intake end thereof projecting toward a side wall of the case for connection with a fuel tank outside the same, there being a bracket fixed relative to the burner and extending therefrom to provide a support whereon the fuel-vaporizing tube is pivotally mounted, said mounting insuring a predetermined relationship between the tube and the burner in the operative position, and a fuel tank having a fuel discharge fitting arranged to make quickly detachable connection with the fuel intake end of said vaporizing tube.

19. In a camp stove comprising a carrying case constituting a burner support, the combination of a burner mounted therein, a fuel-vaporizing tube permanently assembled relative to the burner and extending over the burner to discharge vaporized fuel into the manifold thereof and having a screw-threaded part on the fuel intake end thereof projecting toward a side wall of the case for temporary connection with a fuel tank outside the case, a fuel tank arranged when detached to be placed in the case, a fuel discharge valve fitting on said tank arranged to make quickly attachable and detachable connection with the aforesaid screw-threaded part, and means on said fitting arranged to thread on the screw threaded part on said tube to provide a quickly attachable and detachable connection.

In witness of the foregoing we affix our signatures.

OLE HORSRUD.
EMIL J. NIELSEN.