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(54) Title: IMPROVEMENTS RELATING TO LIQUEFIED PETROLEUM GAS STOVES

(57) Abstract:

A DEVICE FOR THE USE OF LIQUEFIED PETROLEUM GAS, COMPRISING OF A MONOLITHIC IRON ROD STRUCTURE CAPABLE OF WITHSTANDING ALL THE STRESS INVOLVED IN THE TRADITIONAL GHANAIAN WAY OF COOKING.

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(56) Documents cited: SU 161884 DE 3 28603 DE 1031946



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**PATENT SPECIFICATION
COMPLETE SPECIFICATION
IMPROVEMENTS RELATING TO LIQUIFIED PETROLEUM GAS STOVES**

We, Ghana National Petroleum Corporation a statutory Corporation established by PNDC Law 64 and Mr. H.K.N. ASHIE, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:

This invention was a result of intensive research for an L.P. Gas Promotion Project of the Ghana National Petroleum Corporation. The need to identify and develop an indigenous cooking facility emerged from a survey carried out as part of the project.

This design addresses the peculiar characteristics of the Ghanaian way of cooking (vigorous stirring) and is also well suited to that of other African countries.

The invention is also designed to provide affordable gas stoves to promote the utilization of LPG and reduce the continued use of charcoal and wood fuel.

In accordance with the foregoing objectives the invention provides a device for facilitating domestic and commercial cooking viz the use of Liquefied Petroleum Gas. The device for cooking comprises of a body as illustrated in the diagram which takes into account, reasonable ease of various stresses involved in the Ghanaian way of cooking. The rest of the device is to facilitate the design with stable and

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safe stoichiometric ratios of air and Liquefied Petroleum Gas to ensure complete combustion and economic use of gas. In order that the invention may be more clearly understood one embodiment thereof will now be described by way of example, with reference to the accompanying drawings in figure 1 which shows a body of the device comprising:-

- (i) carrier ring (6) which is provided to accommodate the spherical shape of some local cooking utensils (for large scale cooking)
- (ii) The legs (TRIPOD) or stands (8) are provided to guarantee stability for the cooking utensils and serves as stand for the device. The curvature on the stands allows the use of other cooking utensils of smaller or larger diameter than the carrier ring. Utensils of larger diameters can be accommodated on relative sizes of the stove. The shallow base type makes the utensils unlimited. Those with smaller carrier ring diameters can include flat base utensils. The curvature at the UPPER part of the stand withstands to a large extent torsional forces generated by way of stirring to prepare the food which are mainly, corn and cassava dough or flour. The stands made out of iron rods of various diameters and can support totally all stresses\forces involved in the cooking process due to the volume the food

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item, pot shape and any other external force applied to cancel the torsional forces in the process

mentioned. The (DOWN) ring (7) serves as a stability booster to other food processing requirement, such as smoking and Grilling. Smoking is a process which involves the use of psychrometric properties of air to dry and cook fish etc.

(iii) The inner cylinder(3) serves as a housing for the burner. It has the following functions:-

- (a) supports burner
- (b) locates burner in a central position with respect to the body of device.
- (c) provides base of attachment for holding gas valve in place.
- (d) serves as safety guard.

(iv) Burner (4): The burner system is made out of:

- (a) burner top (12) - Its functions are mainly to direct an outlet for combusting gas and air mixture.
- (b) Mixing chamber (4), where the mixture of Liquefied Petroleum Gas and air take place. It is calculated to give little time lag to accommodate little delays in lighting.

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- (c) Pipe (13), permits the transportation of air from the aperture provided on pipe and Liquefied Petroleum Gas provided from the jet of the valve (11) with enough turbulence for complete mixture of both in the mixing chamber and with little starvation to avoid combustion taking place in the pipe.
- (v) The jet valve (11) is an assembly on its own and it permits the regulation of the flow of Liquefied Petroleum Gas to the mixing chamber from a L.P. Gas container.

The devices exist in two different forms under the trade mark 'KLEENKUK' and 'ASH FREE'. The ASH FREE has three variations in size and has a triangular body. The ASH FREE device is only for domestic use purposes. The device is very simple to operate.

To operate the stoves, push down and turn on handle of valve as contained in figure 2 and introduce flame to the burner for the mixture to combust immediately at the vents provided around the edge of the aluminium burner top (12).

The KLEENKUK device is made out of two circular rings whose dimensions vary from 275 mm to 640 mm (7) and 202 mm to 400 mm (6), three stands (8), one burner housing (3) made from cylindrical tubes of various dimensions from 110 mm to 180 mm depending on the size of the device and a jet valve holder (14),

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all these elements are carefully welded to form what is referred to as the body of the device or KLEENKUK. Similarly the burner is made out of two cylindrical tubes of various diameters whereby the diameter of pipe (13) is four times less the diameter of the mixing chamber (4). [whose diameter varies from 70 mm to 108 mm] Both elements are then welded carefully to form the burner. The burner top (12) is made from cast aluminium and machined to the required dimensions.

The jet valve (11) is made from brass and a manipulator (HANDLE) of cast aluminium alloy fixed unto the brass conical plug housed in the body viz screw. The manipulator (HANDLE) is spring loaded and can be operated if special instructions are followed. The jet valve specification can be found in figure 2.

The ASH FREE has similar design conditions as the KLEENKUK but has different structural design as regards its designation that is, it can only be used for domestic (usually table-top) purposes as represented in figure 3. The body (1) is made out of steel plates of 1.6 to 2 mm thick and formed in a triangular shape. The edges of these are then bent to form the stands. The burner is manufactured in the same way as those of the KLEENKUK device by way of welding. They are carried on the inner part of the burner by the elements (2), (7) and (3). The elements that accommodate the cooking utensil are placed on top of the body. This element is made out of a ring (5) and three stands (6) with characteristic curvature on them, they are then welded carefully.

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The body exist in various sizes from 356 mm to 457 mm and the circular ring (j) ranging from 152 mm to 178 mm.

WHAT WE CLAIM IS:-

- (1) A device for the use of Liquefied Petroleum Gas, comprising of a monolithic iron rod structure capable of withstanding all the stress involved in the traditional Ghanaian way of cooking.
- (2) A device as claimed in claim 1, wherein the means of cooking on both domestic and commercial scale can be done using single burner device.
- (3) A device as claimed in claim 2, whereby the means of moving these devices is by simple hand transportation to the place of use, due to the fact that they weigh from 2 to 16 kg.
- (4) A device as claimed in claim 3, wherein the means of operation is simple and therefore can be handled without any complexity.
- (5) The device can be dismantled for replacement of all parts.
- (6) These accessories comprises wind protector, grill and a cover for smoking and grilling of fish, meat etc.

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WHAT WE CLAIM IS:-

- (1) A device for the use of liquefied petroleum gas, comprising of a monolithic iron rod structure capable of withstanding all the stress involved in cooking.
- (2) A device as claimed in claim 1, wherein the means of cooking on both domestic and commercial scale can be done using single burner device.
- (3) A device as claimed in claim 2, whereby the means of moving these devices is by manual transportation to the place of use, due to the fact that they weight 2 to 16 kg.
- (4) A device as claimed in claims 1 to 3, characterised in that it can be dismantled for replacement of all the accessories.
- (5) A device as claimed in claim 4 characterised in that the accessories include wind protector, grill and a cover for smoking and grilling.
- (6) A device as claimed in claims 1 to 5 which include a gas glow valve with a child lock device as a safety measure which can only be pressed to be disengaged before turning to open.

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Fig 1 KLEENKUK

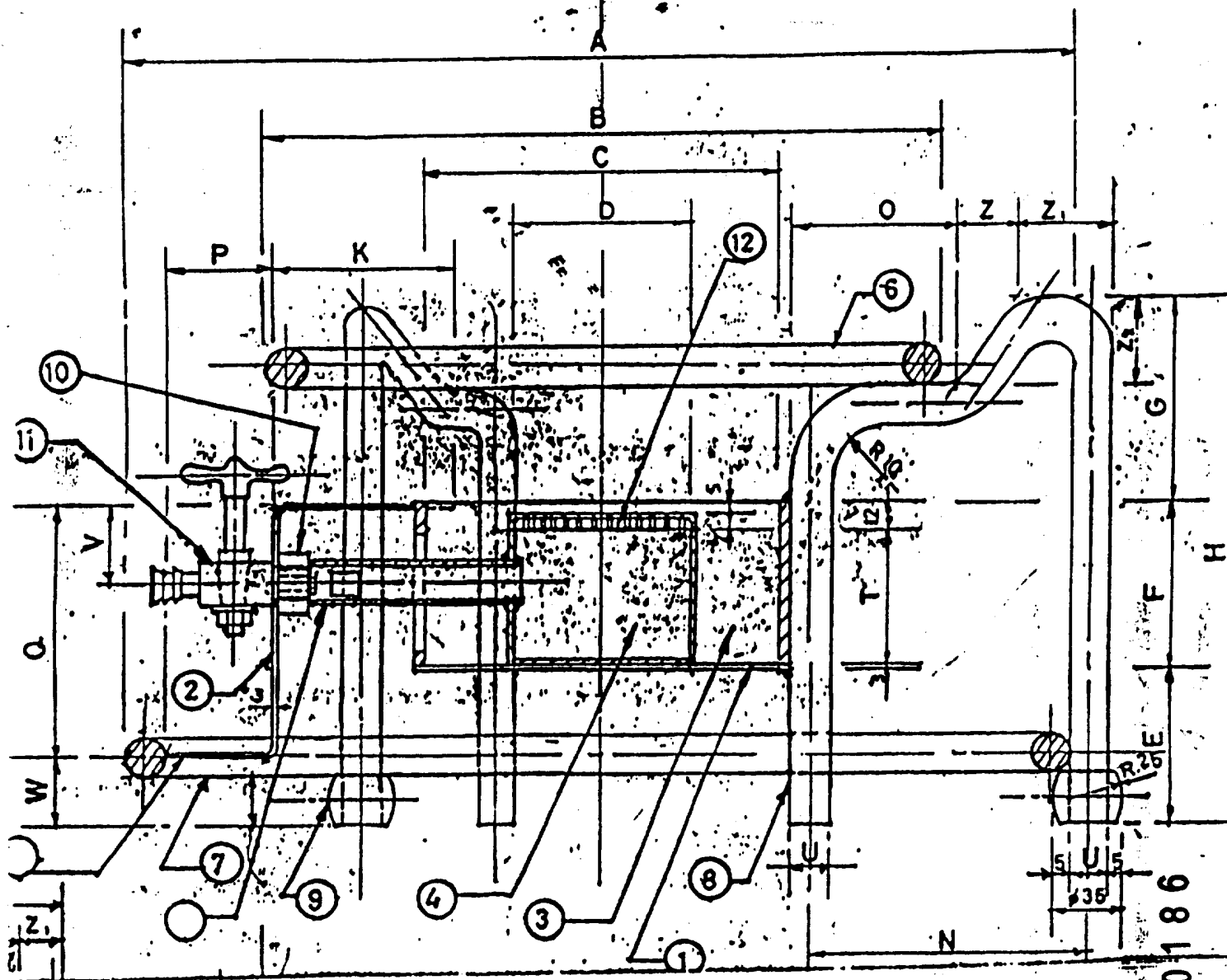
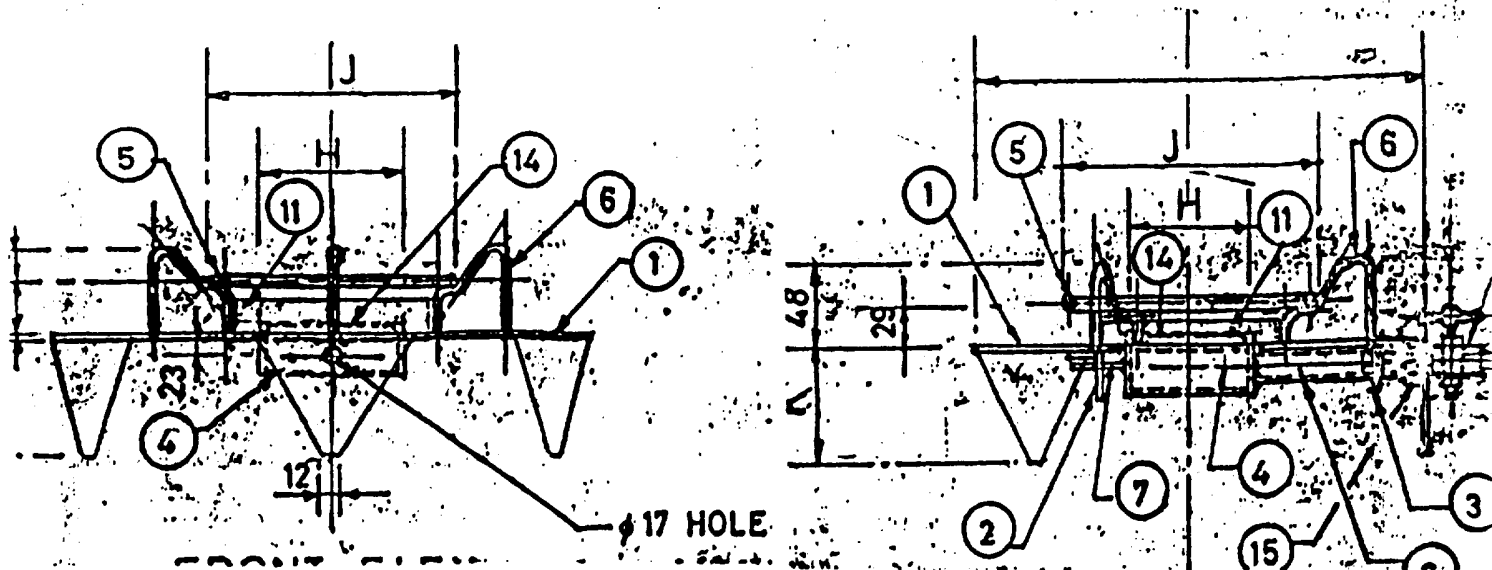


Fig 3 ASHFREE

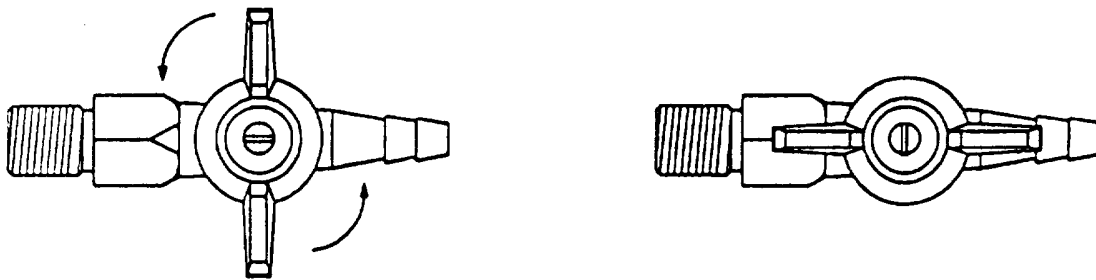


G.N.P.C. VALVE TECHNICAL DATA

The Valve assembly has been designed for use with units which are supplied with Liquid Petroleum Gas (L.P.G.) and is manufactured from brass material to British Standards BS 2872 CZ122 and BS 2874 CZ121.

OPERATING INSTRUCTIONS

To turn on the gas supply, push down the handle and rotate 90° as shown below.



Push down and turn ON

OPERATING PRESSURE

The maximum working pressure for this valve is 1 PSI (Pounds per square inch)
The valve has been tested in accordance with BS 1552 prior to despatch.

MAINTENANCE REQUIREMENTS

Service life depends on the performance of the MOLYKOTE 1102 grease that is used in the assembly. Generally, the assemblies will require regreasing after 40,000 operations of the valve or typically after 3 years.

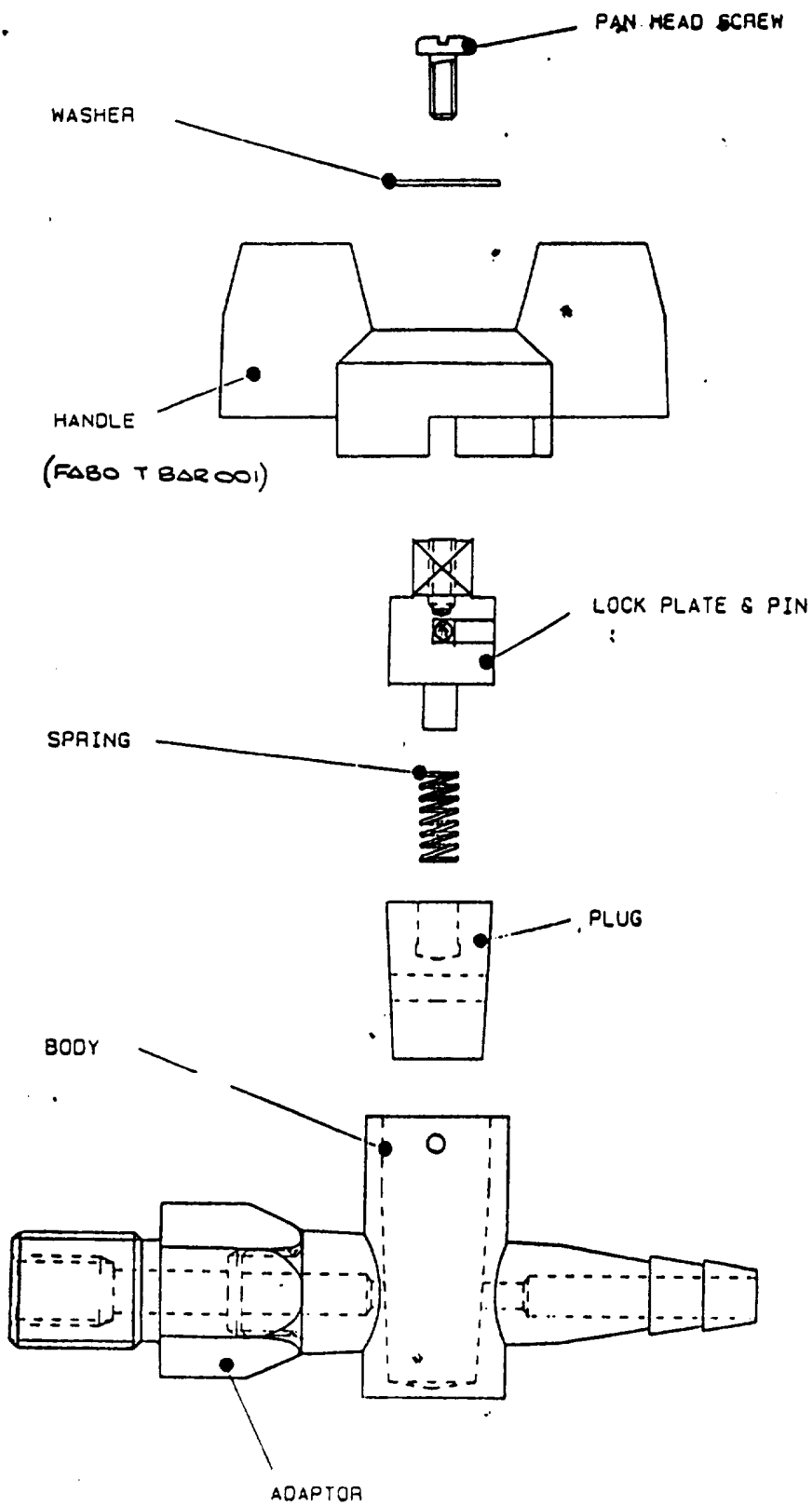
MOLYKOTE 1102 is a gas cock grease which has a mineral oil base and has an operating temperature range of -5°C to +160°C. MOLYKOTE complies with the German standard DIN 3255 for gas cock greases and satisfies a thermal stability of 100°C - 200°C and is resistant to butane and propane.

When servicing the valve assembly the following steps should be taken :-

1. Safely disconnect the valve and remove from the appliance.
2. Unscrew the Pan Head Screw and remove the Washer and Handle.
3. Hold down the Lock-Plate and push out the pin which is located in the valve body.
4. Remove the Lock-Plate and Spring from the assembly.
5. Turn over the valve body and tap the bottom to release the Plug.
6. Remove any excess grease from the Plug and re-apply an even layer of MOLYKOTE grease over the surface of the Plug.
7. Assembly is achieved by reversal of the above procedure.

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