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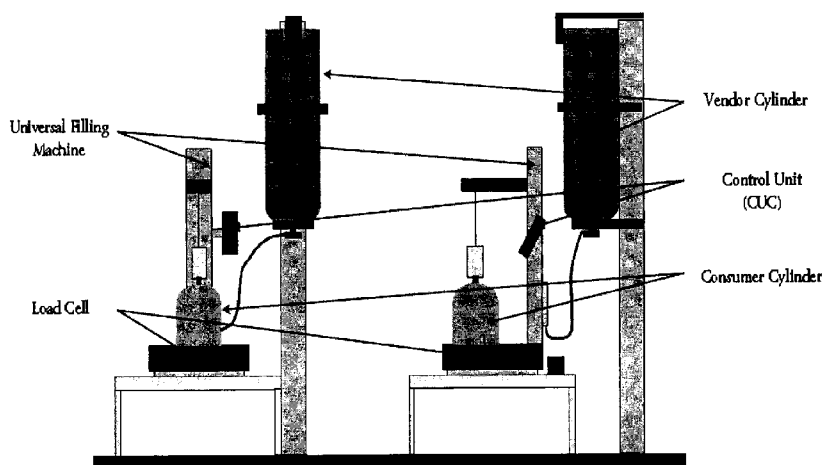
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(54) Title: LIQUEFIED PETROLEUM GAS (LPG) PARTIAL REFILLING MACHINE

Figure 1



Front and Side Elevations of UFM with single consumer and vendor cylinders loaded

(57) Abstract: The present invention is directed to a partial LPG re-filling machine that satisfies partial re-filling of LPG cylinders thereby enabling the consumer to purchase LPG in desired quantity and verify the actual amount of LPG purchase. A partial LPG re-filling machine having features of the present invention comprises a universal filling machine (UFM), transparent composite consumer cylinder and vendor cylinders. The UFM is fitted with load cell, jig mechanism, Irish code reader, mechanical spindle and control unit. The load cell is for placing and weighing the consumer cylinder, jig mechanism holds the consumer cylinder, Irish code reader identifies the unique identity code of the consumer cylinder and the control unit stores information of consumer and vendor cylinders into the internal memory.



Liquefied Petroleum Gas (LPG) Partial Refilling Machine

Technical Field

The present invention relates to a partial re-filling machine for re-filling Liquefied Petroleum Gas (LPG) into composite and steel cylinders, allowing consumers and dealers to partially refill LPG cylinders.

Background to the Invention

[005] The majority of the poor in Africa and other parts of the developing world lack access to modern energy services. Fuel requirements of the urban poor are rarely met. In Kenya, East Africa and other parts of Africa, the urban poor pay above-average prices for energy to meet their cooking, lighting, heating and communication needs. Most households depend on traditional biomass resources including fuel wood and charcoal. Despite the availability and [010] promotion of Liquefied Petroleum Gas (LPG), kerosene and biomass continue to dominate. Inefficient traditional biomass sources have detrimental impacts on health, gender roles, and income.

Reasons for the low adoption of LPG in urban areas include: lack of information about the benefits of LPG; rigid market practices with regards to LPG dispensing; lack of awareness on the [015] negative effects of burning biomass and kerosene; absence of an efficient and reliable supply chain for LPG in many areas, particularly in low income and informal dwelling areas.

To address the health, gender and purchasing power challenges requires that a large number of biomass and kerosene users are converted to LPG users. Indeed, countries such as Kenya have made important efforts to encourage such a switch. To be successful in moving users from [020] biomass and kerosene, however requires that there is a perfect substitute in terms of affordability, hardware, distribution, supply chain as well as cost.

Fuel purchase decisions are primarily driven by income and cost. This means that a substitute will need to involve very low switching costs and be convenient in terms of reach, availability since many of the concerned consumers are in difficult-to-reach areas. Currently, LPG is sold in opaque steel cylinders of between 3kg and 13 kg and the cylinders have to be re-filled to full [005] capacity. A perfect substitute can be found if consumers can be allowed to purchase small units, very frequently E.g. daily or every few days. This is because many of the urban poor have inconsistent daily or weekly income.

Another reason for low penetration of LPG amongst the low income segment of the population is due to rigid industry practices like collection of consumer cylinders at central points such as [010] petrol pumps and supermarkets and their filling and re-filling at centralized locations (depots). Along with this, the industry practice enables unscrupulous businessmen to decant LPG from other oil marketer's cylinders and into other third party cylinders. Thereby depriving the oil marketer's revenues from their assets.

An example of Japanese patent (JP 55074663) for an invention invented by Shimozono Toshiaki [015] involves automation in the filling process by directly inputting the bar code label stuck on the cylinder to a POS unit with scanning by light pen reader.

Another example of Japanese patent application number (JP 20070312225) for an invention invented by S. Hiroshi et al, provides a filling system connected to a management system, by discriminating a bar code or a bar code number or a marking using an explosion preventive [020] camera.

Panama patent application (PA 2006 00197) for an invention invented by Erik Jensen involves use of two separate electronic weighing sections. These are arranged to individually weigh the transport units holding the containers to be filled.

It is therefore the main object of the present invention to enable the partial re-filling of the LPG [025] cylinder in units as desired by the customer and empowering the end user to verify the

actual amount of LPG purchased. The present invention also prevents illegal re-filling of LPG from and to third party cylinders and decentralizes the re-filling of LPG cylinders.

Disclosure of Invention

While the making of various embodiments of the present invention are discussed in detail below, it should be appreciated that the present invention provides many applicable inventive [005] concepts that can be embodied in a wide variety of specific contexts. The specific embodiments discussed here are merely illustrative of specific ways to make the invention and do not delimit the scope of the invention.

To facilitate the understanding of this invention, a number of terms are defined below. Terms defined have meanings as commonly understood by a person of ordinary skill in the areas [010] relevant to the present invention. Terms such as “a”, “an” and “the” are not intended to refer to a singular entity, but include the general class of which a specific example may be used for illustration. The Terms are used to describe specific embodiments of the invention, but their usage does not delimit the invention, except as outlined in the claims.

As used here the term “transparent composite consumer cylinder” is used to refer to a cylinder [015] manufactured using composite material consisting of glass fibre or polyethylene (HD) – reinforced epoxy, modified epoxy with amine or anhydride curing agents, vinyl ester or polyesters. The transparent composite consumer cylinders are calibrated to show volume contained in the cylinder.

The present invention discloses a Universal Filling Machine (UFM) which is fitted with a load [020] cell, a control unit (containing a keypad, display screen and internal memory), an Irish code reader, a jig mechanism and a mechanical refilling spindle. This UFM is used to dispense LPG in partial fills.

A load cell is used for placing and weighing the consumer cylinder before and after re-filling. The jig mechanism holds the consumer cylinder on the UFM while re-filling of the consumer

cylinder from vendor cylinder. The control unit (CUC) comprises of an internal memory keypad and display screen. The UFM's internal memory stores a database of vendor and consumer cylinder, containing Irish identity code as well of unit price and quantity of LPG to be dispensed.

The Irish code reader in the CUC reads the unique identity code of the consumer cylinder and [005] performs a quick check of the cylinder's identity code against the database of cylinders in circulation.

The UFM is flexible to different cylinder diameters, heights and cylinder walls. The installation of UFM maybe on carrousel, in-line in conveyor or as a standalone unit. The operation of UFM can be automatic, semi-automatic or manual.

[010] After the recognition of the consumer cylinder by the CUC of the UFM, the jig mechanism of the UFM locks the cylinder. Once the jigs lock onto the consumer cylinder the vendor enters the value of LPG the consumer desires using the keypad. The vendor then uses a mechanical filling lever to lower the refilling spindle onto the valve of consumer cylinder to re-fill the LPG. In the event, the consumer is not recognized in the database the jig will not lock onto the [015] consumer cylinder and the UFM will not dispense the LPG. On completion, the display screen of the CUC will indicate the final weight of the consumer cylinder.

The above description of the present invention have many advantages, including partial re-filling of the consumer cylinders thereby, satisfying the consumers need for LPG. The load cell enables the consumer to verify the actual amount of LPG purchased as this displays pre and [020] post purchase weight of the consumer cylinder. This prevents illegal re-filling of other marketers' cylinders. This UFM promotes decentralizing the re-filling of LPG cylinder.

The foregoing description is provided for illustrative purposes only and should not be construed as in any way limiting this invention, the scope of which is defined solely by the appended claims.

Brief Description of the Drawings

For a more complete understanding of the features and advantages of the present invention, reference is now made to the detailed description of the invention along with the accompanying figures and in which:

Figure 1 illustrates front and side elevations of the UFM with single consumer and vendor [005]cylinder loaded

Figure 2 illustrates front and side elevations of the UFM with single consumer cylinder and two vendor cylinder loaded

The Claims

We claim

1. A Universal Filling Machine (UFM) for partial refilling of liquefied petroleum gas, the said UFM machine comprising a load cell, a control unit, an irish code reader, a mechanical refilling spindle and a jig mechanism.
2. The UFM as claimed in claim 1, in which the control unit (CUC) consists of: an internal memory, a keypad, and a display screen.
3. The UFM as claimed in claim 1, in which the jig mechanism holds the consumer cylinder in place when refilling.
4. The UFM as claimed in claim 1, in which the load cell places and weighs the consumer cylinder before and after refilling.
5. The UFM as claimed in claim 1, in which the irish code reader identifies and tracks the unique irish codes of the composite and steel cylinders.
6. The CUC as claimed in claim 2, in which an internal memory maintains a database of existing cylinders in circulation.

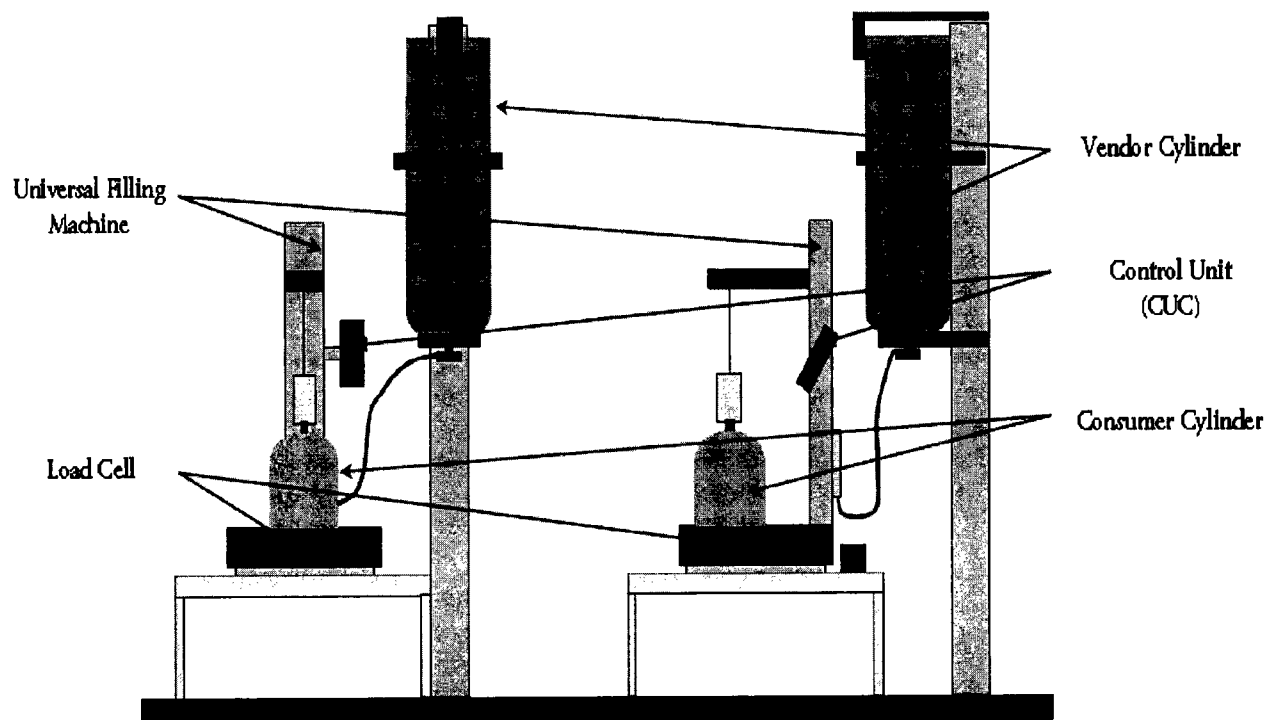
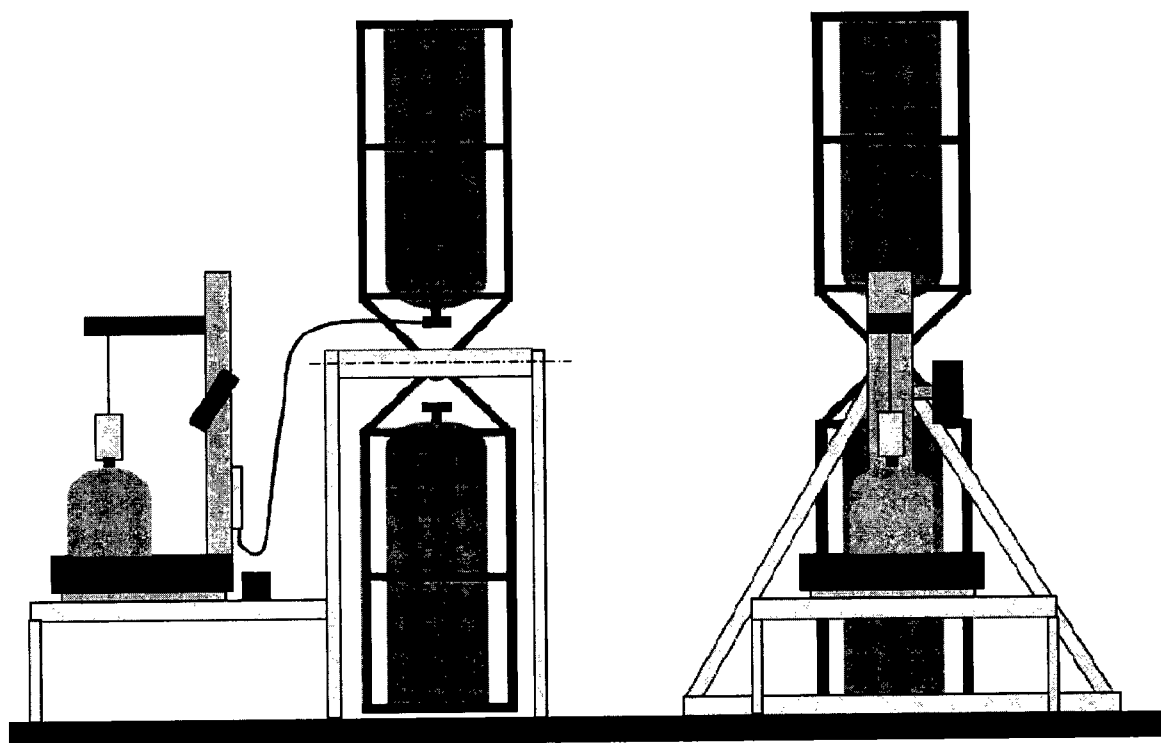
Figure 1*Front and Side Elevations of UFM with single consumer and vendor cylinders loaded*

Figure 2*Front and Side Elevations of UFM with single consumer cylinder and two vendor cylinders loaded*

INTERNATIONAL SEARCH REPORT

International application No
PCT/KE2011/000024

A. CLASSIFICATION OF SUBJECT MATTER
INV. F17C5/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F17C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

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Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/KE2011/000024

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