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(54) **Improvements in or relating to gas meters**

(57) An electronic gas meter is provided for delivering a quantity of gas to a consumer. The gas meter comprises a base meter unit 2 having a digital display 18 to visibly indicate the amount of gas a consumer has used, and an optical data port 20, via which access to electronic circuitry within the base meter unit 2 is provided for data communication purposes. A battery supply for powering the electronic circuitry within the base meter unit is secured behind a battery cover 14. The base meter unit is provided with latching means in the form of three recesses 22, 24, 26 whereby an add-on module 28 can be securely connected to the base meter unit 2 by way of the latching means.

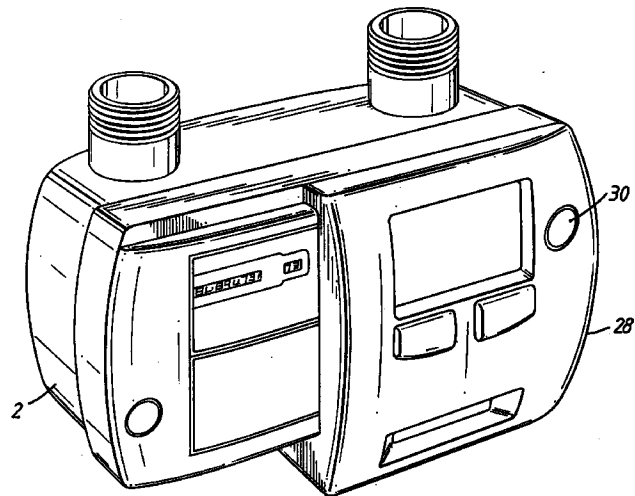


Fig.2

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Description

The present invention relates to utility metering apparatus and in particular to gas meters.

The original gas meter is a mechanical device arranged to measure the quantity of gas supplied and register that amount on a mechanical display. These types of gas meters are being superseded by electronic meters which use acoustic wave devices to measure the flow of gas through the meter which generate signals which are interpreted by a data processor, conveniently a microprocessor arranged to drive electronic displays to give an indication of the amount used.

A typical electronic gas meter is described in the applicant's co-pending patent application number GB9524684.9 which describes a modular gas meter including a base meter unit having a gas valve to control the supply of gas, and an add-on module which changes the functionality of the base meter unit. Such add-on modules may be for pre-payment function or remote meter reading functions. Such meters use an optical communication port to enable the microprocessor to be externally accessed without the need for hard wire electrical connections which could prove a danger in the gas environment.

An aim of the present invention is to utilise this electronic gas meter and provide means whereby it can easily be modified in order to easily change its functionality.

According to the present invention there is provided an electronic gas meter for delivering a quantity of gas to a consumer, said gas meter comprising a base meter unit having a digital display to visibly indicate the amount of gas a consumer has used and an optical data port via which access to electronic circuitry within the base meter unit is provided for data communication purposes, a battery supply for powering the electronic circuitry within the base meter unit and means for securing the battery supply within the base meter unit, characterised in that the base meter unit is provided with latching means whereby an add-on module is securely attached to the base meter unit permitting the add-on module to communicate with the base meter unit.

The latching means may comprise three recesses which are provided towards a front face of the base meter unit at positions close to the centre upper edge and lower edge and at an outer edge of the base meter unit. The add-on module may comprise projections which are adapted to be accommodated within a respective recess to enable the add-on module to be easily slipped onto the base meter unit and secured therewith.

The add-on module may include an orifice for accommodating a retaining means which is arranged to be in register with an orifice within the battery cover to enable the additional module and the battery cover to be secured by a single retaining means.

An embodiment of the present invention will now be described with reference to the accompanying draw-

ings, wherein,

FIGURE 1 shows an isometric view of an electronic base meter unit, and,

FIGURE 2 shows an isometric view of the electronic base meter unit having an additional module connected thereto.

In the gas meter environment there are different types of gas meters which can be used in different circumstances. For example there can be a basic gas meter whereby the meter registers the amount of gas used and requires a meter reader to physically attend the meter and record the reading thereof in order to bill the customer. There are other types of gas meter such as pre-payment meters whereby coins are deposited in the meter in order to allow the consumer to have access to a quantity of gas. There is a further type of pre-payment meter whereby the consumer purchases a card which is in turn inserted into a slot within the meter in order to allow that meter to deliver the quantity of gas up to the value of the card inserted therein. Hitherto if a customer wanted to change between the type of functionality, it was necessary either for the meter to be changed which involved a visit from an engineer to the premises to disconnect the existing meter and fit the type of meter required by the customer, or, in the case of modular meters, a different module is fitted to the base meter unit. This of course is labour intensive, expensive and can be inconvenient to the customer.

The present invention relates to an improved form of modular meter and seeks to make the task of fitting different modules easier.

A meter as shown in Figure 1 can be conveniently described as a base meter unit which when connected to the supply in a customer's premises does not need to be removed in order to adapt the base meter unit for other functions.

The base meter unit 2 comprises a gas inlet port 4 and a gas outlet port 6 which respectively are connected to the gas mains inlet and outlet supply to a premises. The base meter unit has a front cover 8 secured to the meter module 2 by two retaining means 10, 12. The means 10, also serves to secure a battery cover 14. A window 16 is provided for viewing access to a digital display 18 and for providing access to an optical data port 20. In the present example, the front cover 8 is provided with latching means in the form of three recesses 22, 24, 26. These recesses may be of any suitable shape and are arranged to receive a corresponding projection which extends from the rearward side of an additional module which is to be connected to the base meter unit 2.

Referring to Figure 2, there is shown a base meter unit 2 as described with reference to Figure 1 having an additional module 28 connected thereto. It will be appreciated that the module 28 is of one example and that different modules providing different functions may be

connected to the base meter unit 2.

The add-on module 28 may be secured by the retaining means 30 which conveniently is in register with the retaining means 10 that would retain the battery cover 14 as shown in Figure 1. Therefore the module 28 and the battery cover 14 (Figure 1) is retained to the base meter unit 2 by virtue of a single retaining means, which may be a screw which passes through an orifice therein. This has the added benefit that the add-on module 28 can be easily removed together with the battery cover 14 to facilitate quick and easy battery replacement.

As mentioned previously, the recesses 22, 24, 26 (Figure 1) may conveniently be of any shape that affords strong structural support, and by having the three recesses in the position shown the additional add-on modules 28 can be connected to the base meter unit 2 directly from the front of the meter by partially superimposing the add-on module 28 over the front of the base meter unit 2 and sliding the add-on module from the right of the base meter unit 2, when viewed from the front of the base meter unit, to the left thus providing a quick and easy means facilitating the connection and disconnection of the add-on module 28. This is particularly useful where the base meter unit 2 is fitted in a meter box having limited side access.

The add-on module 28 may include a microprocessor and other electronic circuitry depending upon its function and this circuitry will communicate with the electronic circuitry within the base meter unit 2 by way of an optical data port on the reverse side of the add-on module 28, which will be in register with the optical data port 20 on the base meter unit 2 when the add-on module 28 is fitted to the base meter unit 2.

The invention has the following advantages. The add-on module fitting and removal requires no changes to wiring or pipe work. The base meter unit 2 can be changed to act like a credit meter or a pre-payment meter for example merely by replacing one add-on module with another which performs a different function. No additional complexity is experienced when changing the battery housed within the base meter unit 2. The use of an optical data port between the base meter unit 2 and the add-on module 28 means that approval of such equipment by the regulatory authorities is greatly simplified, because the use of optical data ports prevent interference effects that could influence the metrology of the base.

Claims

1. An electronic gas meter for delivering a quantity of gas to a consumer, said gas meter comprising a base meter unit having a digital display to visibly indicate the amount of gas a consumer has used and an optical data port via which access to electronic circuitry within the base meter unit is provided for data communication purposes, a battery

supply for powering the electronic circuitry within the base meter unit and means for securing the battery supply within the base meter unit, characterised in that the base meter unit is provided with latching means whereby an add-on module is securely attached to the base meter unit permitting the add-on module to communicate with the base meter unit.

- 2. A gas meter as claimed in Claim 1, wherein the latching means comprises three recesses which are provided towards a front face of the base meter unit at positions close to the centre upper edge and lower edge and at an outer edge of the base meter unit, whereby said add-on module comprises projections which are adapted to be accommodated within a respective recess to enable the add-on module to be easily slipped on to the base meter unit and secured therewith.
- 3. A gas meter as claimed in Claim 2, wherein the add-on module includes an orifice for accommodating a retaining means which is arranged to be in register with an orifice within the battery cover to enable the additional module and the battery cover to be secured by a single retaining means.
- 4. A gas meter as claimed in Claim 3, wherein the add-on module is provided an optical data port which is arranged to be in register with the optical data port on the base meter unit when the add-on module is securely positioned onto the base meter unit.
- 5. A gas meter as claimed in Claim 4, wherein the add-on module is a pre-payment module.
- 6. A gas meter as claimed in Claim 4, wherein the add-on module is a credit module.
- 7. A gas meter substantially as hereinbefore described with reference to the accompanying drawings.

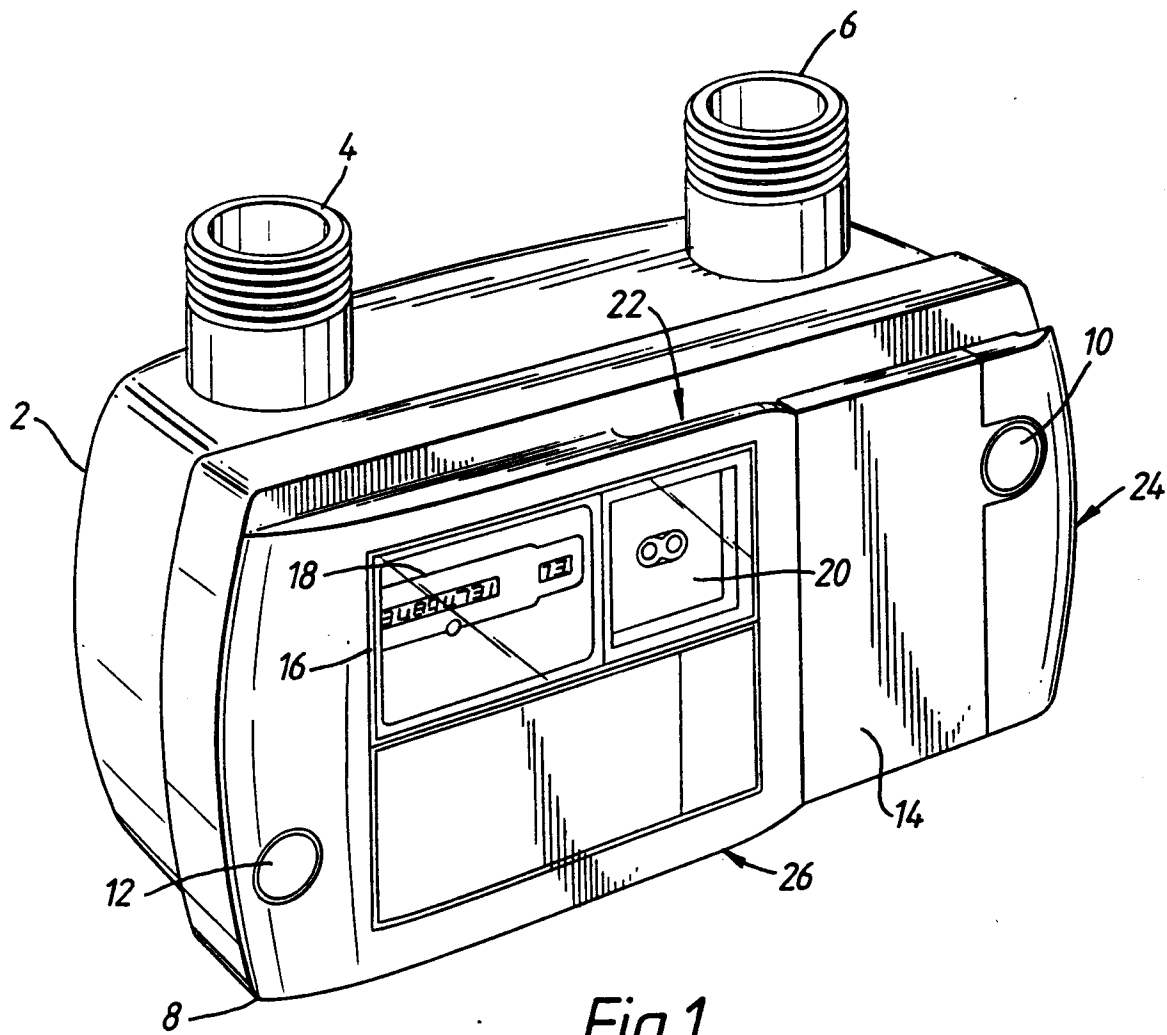


Fig.1

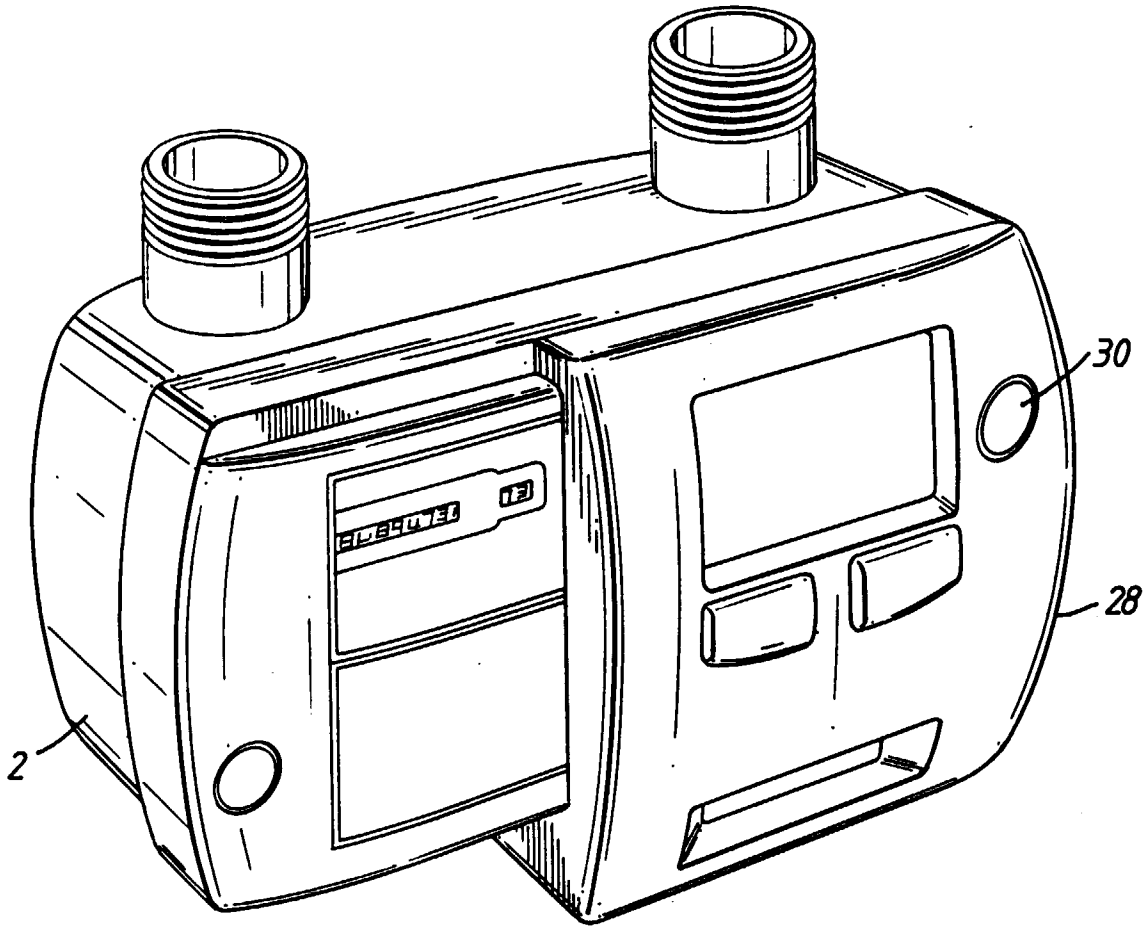


Fig.2