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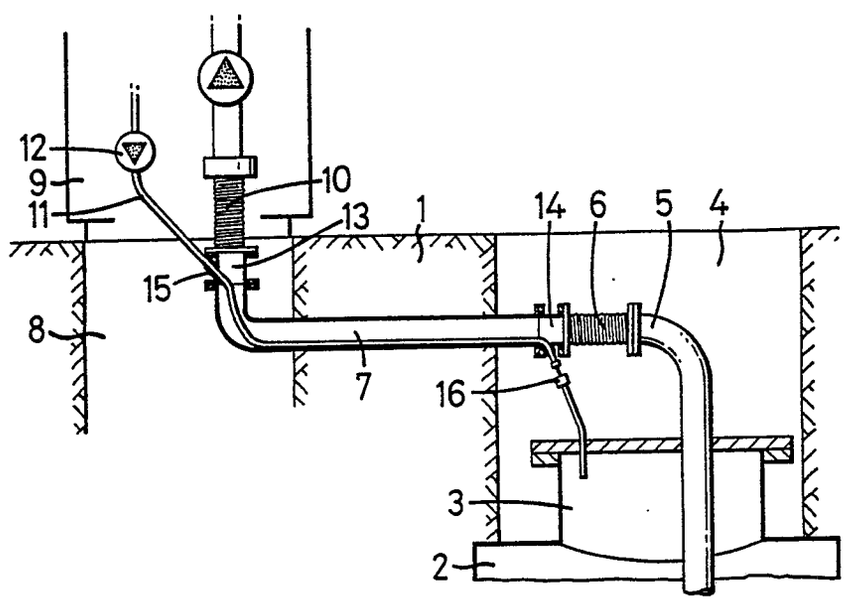
(54) Apparatus for dispensing liquids with a gas return line.

(57) An apparatus for dispensing a liquid product, e.g. gasoline with a product supply pipe which is not readily accessible, e.g. buried, has a gas return line which is run through the product supply pipe by means of sealed inlet and outlet members connected to the product supply pipe.



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APPARATUS FOR DISPENSING LIQUIDS WITH A GAS RETURN LINE

The present invention relates to an apparatus for dispensing liquids, in particular readily vapourisible liquid fuels, e.g. gasoline. It relates in particular to apparatus comprising a product storage vessel, and a dispensing column (e.g. a petrol pump) with the dispensing column and the product storage vessel being connected by a product supply pipe which is not in an easily accessible position. Thus the product pipe may be buried in the ground.

When readily vapourisible liquids, such as gasoline, are dispensed from a product storage tank into another container, for example the fuel tank of a car, there is often a release of vapourised liquid from the container into which the liquid is dispensed. It is desirable to reduce the emissions of such vapours and gases into the atmosphere.

It has been proposed to recover the vapour which is expelled from the receiving vessel when liquid is dispensed into it and to return this vapour to the product storage vessel. US 3016928 discloses a device for extracting gases and vapours from liquid fuel storage containers. A gasoline dispensing column ("pump") is shown which has a gas return line within a fuel supply pipe which extends vertically downward into a storage tank. However it does not deal with the problem of installing gas recovery facilities in dispensing apparatus which was originally built without gas recovery facilities. Thus many existing arrangements for dispensing liquids have relatively long buried horizontal sections of pipe between the storage vessel and the dispensing column. DE 36 13 453 A discloses an apparatus in which a gas return line is located within the product supply hose of a gasoline dispenser (petrol pump). The gas return line is then lead from the dispensing column (petrol pump) and is led into the gas space in the product storage vessel.

The arrangement shown in DE 36 13 453 A is satisfactory if there is sufficient space around the connection between the dispensing column and the storage tank for a separate gas return line to be installed. However many existing arrangements for dispensing liquids, and in particular many existing arrangements for the retail distribution of gasoline (petrol stations) have a connection between the product storage vessel and the dispensing column by means of a pipe which is surrounded by earth or where there is no space adjacent to the liquid supply pipe for insertion of a gas return line adjacent to the liquid supply pipe. There is therefore a need for a liquids dispensing apparatus which allows for gas recovery in such cases.

According to the present invention an apparatus for dispensing a liquid product, in particular a readily vapourisable liquid fuel, which apparatus comprises a product storage vessel, a dispensing column, a product supply pipe which is not readily accessible and which connects the storage vessel and the dispensing column, and a gas return line connecting the dispensing column and the storage vessel which gas return line opens into the dispensing column and the storage vessel at other places than the product supply pipe, and part of which gas return line runs inside the product supply line characterised in that said product supply pipe (7) is provided with sealed inlet and outlet members (13,14,15) for the gas return line.

By arranging for the gas return to run through the product supply pipe where the product supply pipe is not readily accessible, the considerable expense which would result from having to excavate a special passage for the gas return line is avoided. This expense is considerable because not only must the buried sections of the product supply pipe must be excavated, which may amount to 25-30 meters per dispensing column in a gasoline filling station, but special precautions must be taken for the mechanical and chemical protection of the product pipes. The disturbance in the business of a filling station which would result from a major excavation programme is also avoided.

The present invention is particularly useful when there is not vertical straight line connection between the dispensing column and the storage vessel, for example when there is a horizontal portion of the supply pipe which is not easily accessible.

The apparatus of the present invention is preferably provided with a return pump in the gas return line because this makes possible the use of a gas return line with a smaller diameter, which in general will be of the order of 8 mm internal diameter and thus does not significantly reduce the free cross-section of the product pipeline.

The installation of the gas return line is substantially simplified because it is merely necessary to provide the product pipeline at the inlet and outlet locations with corresponding inlet and outlet devices. These can be formed from a tubular intermediate piece with a inlet or outlet connection provided with a seal. Preferably the connectors are provided in the protected area of a dispensing column and in the access pit of the storage vessel. The requirements for the protection of the gas return line are thus relatively small because it does not lie free in the ground and is thus protected from unexpected mechanical or chemical attack. It can thus be in the form of a hose of flexible and

product resistant plastic, for example Perbunan (butyl rubber) or of PTFE. The gas return line may be electrically conducting, either because the material from which it is made is conductive or because it contains a conductive metal insert.

It is highly desirable for the gas return line to be undivided in the region of the inlet and outlet device. Preferably it is undivided throughout the product pipe, in order not to influence the reliability of the apparatus. The inlet and outlet devices on the product pipe then merely need to be arranged for sealing of the periphery of the gas return line, while any necessary pipe connections for the gas return line can be arranged outside the product supply pipe and the inlet and outlet devices. In this way the possibly sensitive regions of the gas return line are easily accessible for checking and maintenance.

The introduction of the gas return line into the product supply pipe may be carried out either directly by insertion of the flexible gas supply line or by means of a spiral, or, for pipe runs with frequent changes in direction, with a pulling wire. If it is not easy to push the gas return line, the spiral or the pulling wire through the product supply pipe on account of the number of changes of direction then the free end of the return pipe or a pulling means attached to it can be connected to a which can be forced through the product pipe under pressure.

The invention will now be described with reference to the drawing which is a schematic representation of the apparatus of the invention. Buried in the ground (1) is the storage vessel (2) for easily vapourisable liquid fuel. The vessel (2) has an upwardly extending portion (3) through which access may be obtained to the vessel. This upwardly extending portion (3) is accessible within an access pit (4). From portion (3) of the tank there extends a portion (5) of a fuel supply pipe forming part of the vessel (2). This is connected by an expansion compensator or distance piece (6) to a buried section (7) of the fuel supply line (7). The fuel supply line (7) ends in a pit (8) under a dispension column (9) and is connected with the internal parts of the dispensing column (9) by means of an expansion compensator (10).

Gas return line (11) leads from the dispensing column (9) through return pump (12) back to the vessel (2). As the fuel supply line and the gas return line are connected with different internal parts of the dispensing column (9) they leave from different parts of the dispensing column. They also open into different parts of the storage vessel. Thus the product supply line (7,5) opens into the liquid space in the vessel while the gas return line opens into the gas space in the upwardly projecting portion (3).

At the end of the buried section (7) of the fuel supply pipe tube connecting pieces (13,14) are connected which are formed as inlet and outlet devices for the gas return line (11). They have a connecting piece (15) through which the gas return line, consisting of flexible plastic is led and which is sealed around the periphery of this line by suitable sealing means. The gas return line therefore needs to have no break at this place. It can if desired lead in a single undivided length from the dispensing column to the storage vessel. It can also be provided with a connector (16) outside the fuel supply pipe (7). This is for example appropriate if the return line on the grounds of mechanical resistance is of a different material from that inside pipe (7). For example it can consist of metal in the exposed region and can consist of flexible plastic pipe (7), in order to provide sufficient flexibility for introduction of the line and to give no occasion for contact corrosion. The tube connector (16) can if desired be mechanically supported by the connector (15) and for this purpose may be connected to it, which however does not alter the principle of the undivided passage of the return line through the connectors or their seals.

Claims

1. An apparatus for dispensing a liquid product, which apparatus comprises a product storage vessel, a dispensing column, a product supply pipe which is not readily accessible and which connects the storage vessel and the dispensing column, and a gas return line which connects the dispensing column and the storage vessel, which gas return line opens into the dispensing column and the storage vessel at other places than the product supply pipe and part of the gas return line runs inside the product supply line characterised in that said product supply pipe is provided with sealed inlet and outlet members (13,14,15) for the gas return line.

2. Apparatus according to claim 1 characterised in that the gas return line is provided with a return pump (12).

3. Apparatus according to either of claims 1 or 2 characterised in that the gas return line (11) is undivided in the area of the inlet or outlet devices (13,14,15).

4. Apparatus according to anyone of claims 1 to 3 characterised in that the inlet and outlet device is formed from a tubular intermediate piece (13,14) with an inlet and outlet connector (15) provided with a sealing means.

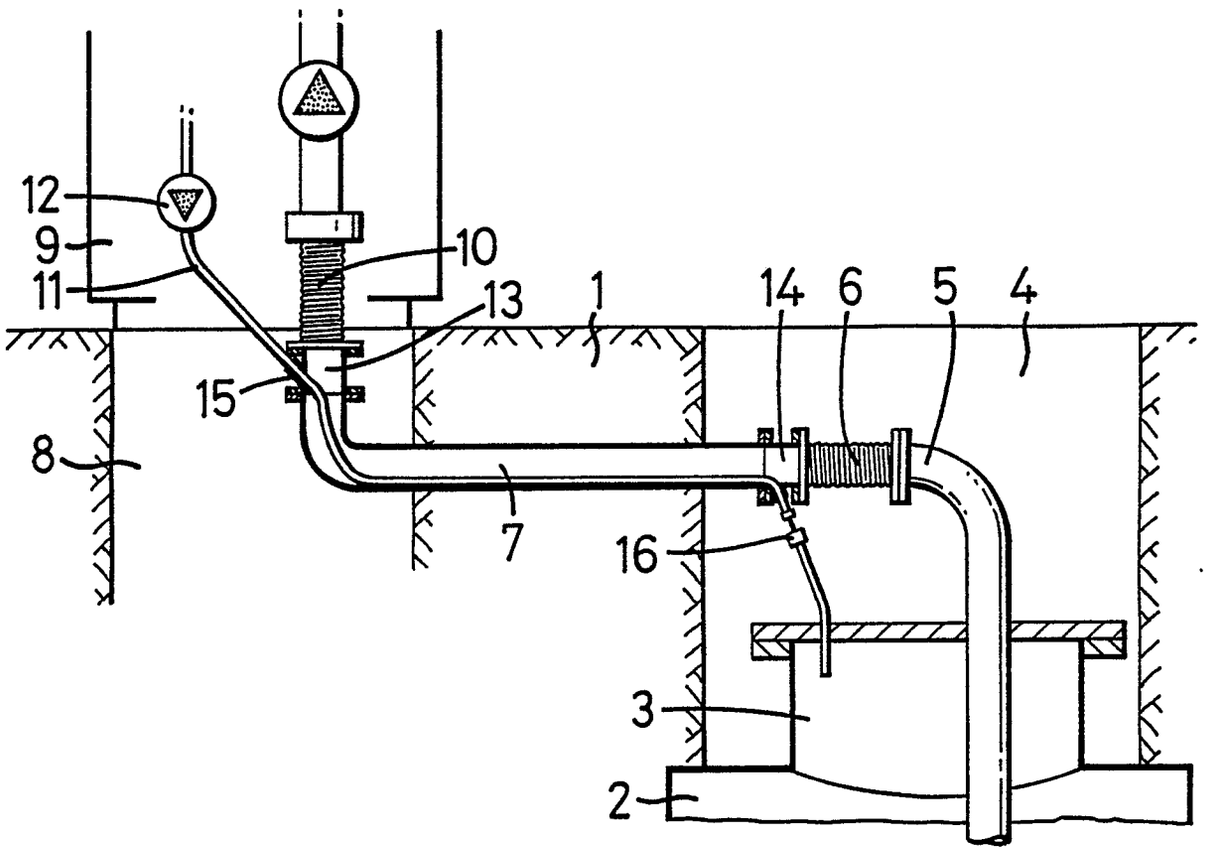
5. Apparatus according to any one of claims 1 to 4, characterised in that the gas return line (11) consists of flexible and fuel resistant plastic.

6. Apparatus according to any one of claims 1 to 5 characterised in that the gas return line (11) is electrically conductive.

7. Apparatus according to any one of claims 1 to 6 characterised in that the inlet and outlet devices (13,14,15) are in the protected area (8) of a dispensing column (9) and/or in the access pit (4) of the storage vessel (2).

8. Apparatus according to any one of claims 1 to 7 wherein there is a horizontal portion of the supply pipe (7) which is difficult of access.

9. Process for the introduction of a flexible return line in a product pipe according to any one of claims 1 to 8 characterised in that the free end of the return line is pulled through the product pipe by means of a pig under pressure.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EUROPEAN SEARCH REPORT

Application Number

EP 89 30 5123

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
D,A	DE-A-3 613 453 (HÜSTER) * Figure 1; claims 1,2 *	1	B 67 D 5/06
A	EP-A-0 262 081 (THE GOODYEAR TIRE & RUBBER CO.)		
D,A	US-A-3 016 928 (BRANDT)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 67 D
F 16 L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21-07-1989	DEUTSCH J.P.M.

CATEGORY OF CITED DOCUMENTS

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