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54 **Apparatus for dispensing liquids with a gas return line.**

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Description

The present invention relates to an apparatus for dispensing liquids, in particular readily vapourisable 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 vapourisable 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. 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 led 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.

US-A-3016928 is concerned with providing a device which can be installed in existing fuel gravity or pump lines. However, the disclosure is concerned with devices which are installed in vertical fuel pipes, and a central gas return pipe runs all the way through the flexible and refuelling hose to the storage tank. 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 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, with minimum obstruction of the total fuel flow path.

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 is 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 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 are formed from a tubular intermediate piece with an inlet or outlet connector provided with a seal. 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 pig 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 dispensing 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 at other places than the product supply line and that part of the gas return line which is not readily accessible runs inside the product supply line, said product supply line is provided with sealed inlet and outlet devices for the gas return line characterised in that the inlet and outlet devices are formed from a tubular connecting piece (13,14) with an inlet and outlet connector (15) provided with sealing means and are in the protected area (pit) (8) of a dispensing column (9) and in the access pit (4) of the storage vessel (2) respectively.
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 any one of claims 1 to 3, characterised in that the gas return line (11) consists of flexible and fuel resistant plastic.
5. Apparatus according to any one of claims 1 to 3 characterised in that the gas return line (11) is electrically conductive.
6. Apparatus according to any one of claims 1 to 5 wherein there is a horizontal portion of the supply pipe (7) which is difficult of access.

Patentansprüche

1. Vorrichtung zum Ausgeben eines flüssigen Pro-

dukts, mit einem Produktlagerbehälter, einer Zapfsäule, einer Produktzufuhrleitung, die schwer zugänglich ist und den Lagerbehälter und die Zapfsäule verbindet, und einer Gasrückführungsleitung, die die Zapfsäule und den Lagerbehälter verbindet; wobei die Gasrückführungsleitung an anderer Stelle in die Zapfsäule mündet als die Produktzufuhrleitung und wobei der schwer zugängliche Teil der Gasrückführungsleitung in die Produktzufuhrleitung eintritt, und wobei die Produktzufuhrleitung abgedichtete Einlaß- und Auslaßeinrichtungen für die Gasrückführungsleitung aufweist,

dadurch gekennzeichnet,

daß die Einlaß- und die Auslaßeinrichtungen aus einem rohrförmigen Verbindungsstück (13,14) mit einem Abdichtmittel aufweisenden Einlaß- und Auslaßstutzen (15) gebildet sind und im Schutzbereich (Schacht) (8) einer Zapfsäule (9) bzw. im Zugriffsschacht (4) des Lagerbehälters (2) angeordnet sind.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Gasrückführungsleitung mit einer Rückführungspumpe (12) versehen ist.

3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Gasrückführungsleitung (11) im Bereich der Einlaß- oder der Auslaßeinrichtungen (13,14,15) ungeteilt ist.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Gasrückführungsleitung (11) aus flexiblem und kraftstoffbeständigen Kunststoff besteht.

5. Vorrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Gasrückführungsleitung (11) elektrisch leitfähig ist.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, bei der ein horizontaler Abschnitt der schwer zugänglichen Zufuhrleitung (7) vorgesehen ist.

Revendications

1. Appareil pour distribuer un produit liquide, lequel appareil comporte une cuve de stockage de produit, une colonne de distribution, un conduit d'alimentation en produit qui n'est pas aisément accessible et qui raccorde la cuve de stockage et la colonne de distribution, et une conduite de retour de gaz qui raccorde la colonne de distribution et la cuve de stockage ; laquelle conduite de retour de gaz débouche dans la colonne de distribution en d'autres emplacements que la conduite d'alimentation en produit et la partie de la conduite de

retour de gaz qui n'est pas aisément accessible passe à l'intérieur de la conduite d'alimentation en produit, ladite conduite d'alimentation en produit étant pourvue de dispositifs étanches d'entrée et de sortie pour la conduite de retour de gaz, caractérisé en ce que les dispositifs d'entrée et de sortie sont formés d'une pièce tubulaire (13, 14) de raccordement avec un raccord d'entrée et de sortie (15) pourvu de moyens d'étanchéité et sont dans la zone protégée (fosse) (8) d'une colonne (9) de distribution et dans la fosse d'accès (4) de la cuve (2) de stockage, respectivement.

2. Appareil selon la revendication 1, caractérisé en ce que la conduite de retour de gaz est pourvue d'une pompe (12) de retour.

3. Appareil selon l'une des revendications 1 et 2, caractérisé en ce que la conduite (11) de retour de gaz est indivisée dans la zone des dispositifs d'entrée ou de sortie (13, 14, 15).

4. Appareil selon l'une quelconque des revendications 1 à 3, caractérisé en ce que la conduite (11) de retour de gaz est constituée d'une matière plastique flexible et résistante aux combustibles.

5. Appareil selon l'une quelconque des revendications 1 à 3, caractérisé en ce que la conduite (11) de retour de gaz est électriquement conductrice.

6. Appareil selon l'une quelconque des revendications 1 à 5, dans lequel la conduite (7) d'alimentation comporte un tronçon horizontal qui est difficile d'accès.

