

DESCRIPTION

HOSE CONNECTING DEVICE AND CONTAINER FOR LIQUID

Technical Field

[0001]

The present invention relates to a hose connecting device and a container for liquid, and more particularly to a hose connecting device or the like having a configuration such that a hose is prevented from being inserted more than required into a liquid storage tank when such a liquid storage tank must be replenished and at the same time, the hose is prevented from slipping out of the tank accidentally.

Background Art

[0002]

As a device for use in replenishing a liquid into the liquid storage tank, a following manual oil feeding pump has been known. That is, by sucking or discharging kerosene with a manual pump portion, the discharged kerosene is supplied to a kerosene tank incorporated in, for example, an oil stove or the like as a built-in tank through a discharge pipe. This pump is provided with a rod-like member having an engagement stopper at the front end of the discharge pipe and thus, when inserting the discharge pipe into such a built-in tank, the discharge pipe is blocked from coming into inside more than required by this stopper (patent document 1). The insertion of the discharge pipe is restricted so as to prevent the front end of the discharge pipe from being dipped into liquid in the tank during supplying of the liquid, and when the discharge pipe is pulled out from the tank after the supply is completed,

liquid adhering to the outside surface of the pipe can be prevented from being scattered around the tank during retracting of the discharge pipe. Regarding the restriction of insertion of the discharge pipe, the patent document 1 discloses an engagement hook to be engaged with the peripheral wall of an oil supply port of the incorporated kerosene tank. This hook is configured to be slid on the rod-like member mounted on the discharge pump and upon supplying oil, the position thereof relative to the peripheral wall of the oil supply port is adjusted by loosening a fixing bolt of the hook.

Patent Document 1: Japanese Laid-Open (Kokai) Patent
Application Publication No. 2000-009038 (FIGS. 4 and 8)

Disclosure of the Invention

Problem to be Solved by the Invention

[0003]

However, in the manually operated oil supply pump described above, the rod-like member is press-fitted to a rod press-fit portion formed at the front end of the discharge pipe and extended in a direction opposite to an insertion direction of the discharge pipe into the built-in kerosene tank from this rod press-fit portion. Although the insertion of the discharge pipe is limited by an engagement stopper mounted on this rod-like member, this engagement stopper cannot ensure a sufficient connecting stability against slippage of the discharge pipe from the tank.

[0004]

As a container for containing liquid to be replenished to the liquid storage tank, an integral hose type in which an end of the hose is integrally directly connected to the container is available. This

container can store and carry a liquid in a manner such that the liquid is accommodated in the container, and upon carrying out a replenishment operation, manual inserting of the front end of the hose into the tank and lifting the container above the tank to tilt it permit the liquid in the tank to be supplied into the tank.

[0005]

Nevertheless, with a container having attached thereto such an integral hose, as of now there has been distributed no type in which the insertion of the hose into the tank is suppressed to a given limit. Although it may be possible to consider such a contrivance that the rod-like member with the above-mentioned engagement stopper is attached to the front end of the hose, this rod-like member cannot ensure a sufficient connecting stability against slippage of the hose. Thus, if the tank is moved by a replenishment operation accompanying lifting and tilting of the container, the likelihood is that the hose might be slipped out of the tank accidentally, so that liquid in the hose may be scattered around the tank. On the other hand, the engagement hook is not easy to handle because the position of the hook needs to be adjusted by loosening the fixing bolt upon usage.

[0006]

From the foregoing circumstances, it has been desired that the insertion of the hose into the liquid storage tank is limited and also the hose is connected with stability against slippage from the tank, when liquid is supplied by way of the hose.

Means for Solving the Problems

[0007]

The present invention provides a hose connecting device and a container for liquid in which the above-described problems are addressed.

The hose connecting device in accordance with the present invention is intended for detachably connecting a hose to a liquid storage tank and includes a ring-like or annular base portion configured to have an inner diameter thereof which allows the front end of the hose to be inserted therethrough. A first engaging portion is extended from the base portion in a direction corresponding to a direction in which the hose insertion into the tank is carried out. The first engaging portion includes an outwardly projecting portion formed at a predetermined distance from the base portion, which extends outwardly with respect to a central axis of the base portion. A flexible second engaging portion is extended over an extent which is larger than the predetermined distance in the insertion direction of the hose from the base portion. The second engaging portion includes a substantially L-shaped hook portion at a front end thereof.

[0008]

The container according to the present invention is a container for containing a liquid to be supplied to a liquid storage tank and includes a container main body in which liquid is received for containing, a hose which is connected to the container main body at a first end portion thereof, which is capable of fluidly communicating with the inside of the container main body, and a hose connecting device which is provided at a second end portion of the hose for connecting this hose to the tank detachably in a state where a front end of the hose is inserted into the tank by a predetermined length. The hose connecting device is

provided with a first engaging portion which comes in contact with the peripheral wall defining a hose insertion hole of the tank in the inserted state of the hose, to block the hose from being inserted into the tank by a length more than the predetermined length and a second engaging portion which engages the peripheral wall of the hose insertion hole to restrict any movement of the hose in a direction away from the tank.

Effect of the Invention

[0009]

According to the present invention, upon replenishment of a liquid through the hose, insertion of the hose into the liquid storage tank by a larger length than required is blocked by the first engaging portion. Consequently, the front end of the hose can be prevented from being dipped in the liquid within the tank upon replenishment. Further, because a movement of the hose in the direction away from the tank is restricted by the second engaging portion, the hose can be prevented from slipping out of the tank.

[0010]

The other objects and features of the present invention will be understood from the following description with reference to the accompanying drawings.

The content of Japanese Patent Application No. 2005-177798, which is a basis for declaration of priority, is incorporated herein by reference.

Brief Description of the Drawings

[0011]

FIG. 1 is an explanatory diagrammatic view showing a state of a container and a liquid storage tank according to an embodiment of the present invention upon replenishment.

FIG. 2 is a structural view including front and other views (A) through (C), showing the configuration of a hose with a connecting device which constitutes the container according to the embodiment.

FIG. 3 is a detailed view including views seen from several sides, and showing the configuration of the connecting device according to the embodiment.

FIG. 4 is a partial perspective view showing the configuration of a hose insertion portion of the liquid storage tank according to the embodiment.

FIG. 5 is a partial cross-sectional view showing a connecting state of the hose to the hose insertion portion.

Description of Reference Numerals

[0012]

1: container, 2: container main body, 3: hose, 3a: first end portion of hose, 3b: second end portion of hose, 4: hose connecting device, 41: base portion, 41a: pawl portion, 42: first engaging portion, 42a: outwardly projecting portion, 42b: tongue portion, 43: second engaging portion, 43a: hook portion, 6: liquid storage tank, 61: hose insertion portion of tank, 61a: peripheral wall of hose insertion hole, Lh: central axis of hose, H: hose insertion hole, C: cutout

Best Mode for Carrying Out the Invention

[0013]

Hereinafter, the embodiment of the present invention will be described with reference to the accompanying drawings.

FIG. 1 is an explanatory diagrammatic view showing a condition at the time of supplying from a container 1 according to the embodiment of the present invention.

According to this embodiment, the container 1 is a portable integral hose-type container in which a hose 3 is connected directly to a container main body 2. When the container main body 2 is lifted above a targeted liquid storage tank 6 and tilted with the hose 3 inserted into a hose insertion hole in the tank 6, liquid inside is supplied to the tank 6 for replenishment. In this embodiment, aqueous solution of urea (hereinafter referred to as urea aqueous solution) is received in the container 1. The urea aqueous solution is used as reducing agent for purifying NO_x in exhaust gas in an exhaust gas purifying system which adopts urea SCR (Selective Catalytic Reduction). In this embodiment, the tank 6 is mounted on a vehicle to be employed as a constituent of the exhaust gas purifying system for a diesel engine. Urea aqueous solution serving as the reducing agent for NO_x is received in the container main body 2 and stored and transported for replenishment of the tank 6.

[0014]

In the container 1, the hose 3 is connected to the container main body 2 at an end portion 3a thereof (corresponding to "first end portion"), thereby fluidly communicating with the inside of the container main body 2 through this end portion 3a. A hose connecting device 4 for securing connection of the hose 3 to a hose insertion portion 61 of the tank 6 is attached to the other end portion 3b (corresponding to "second end

portion") of the hose 3. Upon replenishment, the hose 3 is connected to the tank 6 such that the end portion 3b is inserted into the tank 6 by a predetermined length. In the meantime, the connection of the hose 3 to the tank 6 is achieved in such a condition that the hose is allowed to be attached to or detached from the tank 6 by means of the hose connecting device 4.

[0015]

Figure 2 represents the hose 3 which constitutes the container 1 of this embodiment in a condition that the hose connecting device 4 is attached to the end portion 3b. FIG. 2A is a front view of the hose and the hose connecting device which constitute the container 1, FIG. 2B is an enlarged side view of the end portion 3b of the hose 3 and FIG. 2C is an enlarged bottom view of the end portion 3b of the hose 3.

According to this embodiment, the hose 3 is formed into bellows throughout its entire length in order to obtain sufficient flexibility and a front end pipe portion 32 is formed continuously from a bellows portion 31 in order to secure insertability to the tank 6 and diffidence of liquid upon replenishment. The hose connecting device 4 is attached coaxially with a central axis Lh of the hose 3. According to this embodiment, the connection of the hose connecting device 4 to the hose 3 is carried out through a pawl portion of the hose connecting device 4 as described later, so that the hose connecting device 4 is attached to the hose 3 to be rotatable about the central axis Lh.

[0016]

Figure 3 shows the configuration of the hose connecting device 4 according to this embodiment, in which FIG. 3A is a front view of the hose connecting device 4, and FIGS. 3B and 3C are a side view and a

bottom view, respectively, of this device 4.

According to this embodiment, the hose connecting device 4 is formed of a material having flexible property such as synthetic resin material, and provided with a circular (i.e., ring-like) base portion 41 extending annularly around a central axis thereof and two engaging portions 42, 43 extended in an insertion direction Di of the hose 3 to the tank 6 from the base portion 41. This embodiment adopts synthetic resin such as polyethylene and the base portion 31 and the respective engaging portions 42, 43 are formed as one integral part.

[0017]

The base portion 41 applies a sufficient strength for connection to the hose 3 and has a ring-like shape having an inner diameter allowing the hose 3 to be inserted therethrough and an outer diameter substantially the same as a diameter of the hose insertion hole H (FIG. 4) of the tank 6. A pawl portion 41a is formed on the base portion 41 such that it radially inwardly projects from the inner circumference and the pawl portion 41a engages a dent in the bellows of the hose 3 so as to achieve rotatable connection of the hose connecting device 4 to the hose 3. Such connection eliminates distortion of the hose 3 upon replenishment, thereby smoothing the replenishment and preventing the hose 3 from being damaged. According to this embodiment, a plurality of pawl portions 41a is provided at an equal interval along the circumference of the inner periphery of the base portion 41.

[0018]

The one engaging portion 42 (corresponding to the "first engaging portion") is provided for restricting insertion of the hose 3 to the tank 6 and is extended in the insertion direction of the hose Di from the base

portion 41. An outwardly projecting portion 42a is formed at a position spaced a predetermined distance $s1$ from the base portion 41 of the first engaging portion 42 such that it extends outwardly with respect to the central axis Lh . The entire length of the first engaging portion 42 is larger than the distance $s1$ and, at a front end beyond the outwardly projecting portion 42a, a tongue portion 42b having a reduced width is provided. The tongue portion 42b prevents the hose connecting device 4 from rotating when the hose 3 is connected to the tank 6. In the meantime, the distance $s1$ is determined in accordance with the insertion length of the hose 3 to the tank 6. In this embodiment, the first engaging portions 42 are formed in a circular curve having a center thereof located on the central axis Lh and arranged at two positions on the base portion 41 opposite to each other with respect to the central axis Lh .

[0019]

The other engaging portion 43 (corresponding to the "second engaging portion") prevents the hose 3 from slipping out of the tank 6 and is extended in the insertion direction of the hose Di from the base portion 41 by a larger length than the distance $s1$. A substantially L-shaped hook portion 43a is formed at the front end of the second engaging portion 43 such that it is curved outwardly with respect to the central axis Lh . That is, the hook portion 43a is formed to be shifted in the insertion direction of the hose Di from the outwardly projecting portion 42a of the first engaging portion 42, so that a peripheral wall 61a (FIG. 4) of the hose insertion hole is pinched by the outwardly projecting portion 42a and the hook portion 43a. In this embodiment, the second engaging portion 43 is also formed in circular curve extending around the

central axis Lh like the first engaging portion 42 and arranged at two positions on the base portion 41 opposite to each other with respect to the central axis Lh. The first and second engaging portions 42, 43 are disposed to be spaced apart every 90° along the circumference from one another.

[0020]

Figure 4 shows the structure of the hose insertion portion 61 provided on the liquid storage tank 6 according to this embodiment as seen obliquely from above.

In this embodiment, the hose insertion portion 61 is provided on the top ceiling of the tank 6 and a hole designated at "H" (that is, hose insertion hole), which is open upward is formed. The hose insertion hole H has substantially the same diameter as the base portion 41 of the hose connecting device 4. Cutouts C are formed in the wall portion 61a (that is, peripheral wall) of the hose insertion portion 61 in which the hose insertion hole H is formed, in a width substantially coincident with the width of the tongue portion 42b of the first engaging portion 42. When the hose 3 is connected to the tank 6, the tongue portion 42b is engaged in the cutout C to prevent rotation of the hose connecting device 4 with respect to the hose insertion portion 61. In the meantime, even if no cutout C is provided in the peripheral wall 61a, the tongue portion 42b functions as a guide for insertion and at the same time, functions as a positioning means for aligning the centers of the hose 3 and the hose connecting device 4 after connection.

[0021]

FIG. 5 shows a connection state of the hose 3 to the hose insertion portion 61 under this embodiment through a sectional view

taken in the axial direction of the hose 3 and the hose insertion portion 61.

The connection state of the hose 3 and the tank 6 under this embodiment will be described and at the same time, an effect obtained by this embodiment will be described with reference to FIG. 5.

According to this embodiment, when the hose 3 is inserted into the tank 6 in order to supply and replenish a liquid (that is, urea aqueous solution) from the container 1, the outwardly projecting portion 42a of the first engaging portion 42 comes in contact with the peripheral wall 61a and consequently, the insertion length of the hose 3 is determined and also insertion of the hose 3 into the tank 6 more than a required extent is blocked. Thus, the front end of the hose 3 can be prevented from being dipped in the urea aqueous solution in the tank 6 during replenishing operation. Since the first engaging portions 42 are provided at symmetrical positions with respect to the central axis Lh of the hose 3, the insertion of the hose 3 can be limited securely and the posture of the hose 3 upon replenishment can be stabilized.

[0022]

Further, since the substantially L-shaped hook portion 43a is provided on the second engaging portion 43, even when the hose 3 is attempted to be pulled out from its insertion state accidentally, the hook portion 43a is hooked on the peripheral wall 61a so as to prevent the hose 3 from slipping out. According to this embodiment, the hose connecting device 4 is entirely formed of resin material so as to provide the second engaging portion 43 with sufficient flexible property. Consequently, when connecting the hose 3 to the tank 6, the hose connecting device 4 can be readily attached to the hose insertion portion

61 by slacking the second engaging portion 43 easily. Further, after the replenishment is completed, the hose connecting device 4 can be removed from the hose insertion portion 61 by slacking the second engaging portion 43. By providing the second engaging portions 43 at symmetrical positions with respect to the central axis Lh, the hose 3 can be prevented securely from being slipped out and the second engaging portion 43 can be easily slacked upon attachment or detachment of the hose 3.

[0023]

The present invention can be applied not only to the container 1 for receiving urea aqueous solution but also to generally used containers for liquid.

The first and second engaging portions 42, 43 may be provided at three or more positions spaced along the circumference as required.

As described above, the preferred embodiments of the present invention have been described and the scope of the present invention is not restricted to this description but shall be judged according to an applicable law based on the description of the scope of claims.

CLAIMS

1. A hose connecting device for detachably connecting a hose to a liquid storage tank, comprising:

a ring-like base portion configured to have an inner diameter capable of allowing a front end of the hose to be inserted therethrough;

a first engaging portion configured to extend in a direction of insertion of the hose with respect to the tank from the base portion and include an outwardly projecting portion formed at a predetermined distance from the base portion, the projecting portion extending outwardly with respect to a central axis of the base portion; and

a flexible second engaging portion configured to be extended by a length larger than the predetermined distance in the insertion direction of the hose from the base portion and to include a substantially L-shaped hook portion formed at a front end thereof.

2. The hose connecting device according to claim 1, wherein the first engaging portion is extended by a length larger than the predetermined distance.

3. The hose connecting device according to claim 1, wherein the first engaging portion is extended by a length larger than the predetermined distance and includes a tongue portion which is to be engaged in a cutout of a hose insertion portion provided on the tank at a front end thereof.

4. The hose connecting device according to claim 1, wherein the first engaging portions are provided at a plurality of positions along a circumference of the base portion.

5. The hose connecting device according to claim 1, wherein the second engaging portions are provided at a plurality of positions along a

circumference of the base portion.

6. The hose connecting device according to claim 1, wherein the base portion and the first and second engaging portions are integrally formed of resin material.

7. A container for liquid comprising:

a container main body in which the liquid is received;

a hose connected to the container main body at a first end portion thereof, the hose fluidly communicating with an inside of the container main body through the first end portion; and

the hose connecting device according to claim 1 attached to a second end portion of the hose on an opposite side to the first end portion.

8. The container according to claim 7, wherein the hose is formed in bellows, and

the base portion of the hose connecting device includes a pawl portion configured to engage a dent of the bellows.

9. A container for liquid to be supplied to a liquid storage tank, comprising:

a container main body in which the liquid is received;

a hose connected to the container main body at a first end portion thereof, the hose fluidly communicating with an inside of the container main body through the first end portion; and

a hose connecting device provided at a second end portion of the hose for connecting the hose to the liquid storage tank detachably in a state where a front end of the hose is inserted into the tank by a predetermined length,

wherein the hose connecting device comprises:

a first engaging portion which comes in contact with a peripheral wall defining a hose insertion hole of the tank in a inserted state of the hose to thereby block the hose from being inserted into the tank by a length more than the predetermined length, and a second engaging portion which engages the peripheral wall to limit movement of the hose in a direction separating away from the tank.

10. The container according to claim 9, wherein

the hose connecting device comprises a ring-like base portion configured to have an inner diameter capable of allowing the second end portion to be inserted therethrough,

the first engaging portion is extended in a direction of insertion of the hose with respect to the tank from the base portion and has an outwardly projecting portion extending outwardly with respect to a central axis of the base portion at a predetermined distance from the base portion, and

the second engaging portion is flexible and extended by a length larger than the predetermined distance in the insertion direction of the hose from the base portion and has a substantially L-shaped hook portion at a front end thereof.

11. The container according to claim 10, wherein the first engaging portion is extended by a length larger than the predetermined distance and has a tongue portion at a front end thereof, the tongue portion being capable of engaging in a cutout formed in the peripheral wall defining the hose insertion hole of the tank.

12. The container according to claim 9, wherein the first engaging portions are provided at a plurality of positions along a circumference of the base portion.

13. The container according to claim 9, wherein the second engaging portions are provided at a plurality of positions along a circumference of the base portion.

14. The container according to claim 9, wherein the liquid comprises urea aqueous solution.