A bulk bin and bag dispensing apparatus comprises a bag fitment having an elongated buttress female thread and a nipple adapted to be joined to the bag fitment. The nipple comprises an elongated body portion having an axial flow passage therethrough and a projection portion extends radially therefrom. The body portion further includes a first end and a second end. The first end is defined by male buttress thread thereto and the second end is defined by NPT thread thereto. The first end includes a ring cutter and at least one sealing means attached thereto so that the nipple stokes threadedly within the elongated buttress female thread causing the ring cutter to puncture a bag membrane to thereby permit liquid to be dispensed through the flow passage.
BULK BIN AND BAG DISPENSING APPARATUS

FIELD OF THE INVENTION

[0001] This invention relates to bulk shipping containers and more particularly, to an improved dispensing apparatus used in a bulk bin and bag combination or bag-in-box for storage and dispensing of a flowable material. The bag-in-box as known in the art is type of a container for the storage and transportation of liquid or semi-liquid material.

BACKGROUND OF THE INVENTION

[0002] Containers and/or intermediate bulk container (IBC) is a container used for transport and storage of fluids and bulk materials. They are generally cubic in form and therefore can transport more material in the same area than cylindrically shaped containers and far more than might be shipped in the same space if packaged in consumer quantities. They generally rely on plastic liners that can be filled and dispensed with a variety of systems. The manufacturer/processor of a product can bulk pack a product in one country and ship it to many other countries at a reasonably low cost where it is subsequently packaged in final consumer form or consumed in industrial processes. IBC's range in size but are generally 220 to 330 gallons. The length and width of an IBC is usually dependent on the pallet dimension standard of a given country. Historically, the standard dispense fitment on an IBC bag liner has had a 2" British Standard Pipe (BSP) thread. The dispense fitment is generally made of a relatively soft polyethylene material so that it can be welded to the polyethylene film used to construct the bag. To dispense the product from the bag, the membrane on the dispense fitment is punctured. Furthermore, to facilitate dispensing, a valve is typically threaded into the dispense fitment. The valve either has a mating male thread or utilizes a nipple to join the valve to the fitting. Generally, the membrane is punctured by use of a crown cutter or a needle inserted on the end of the nipple. As the valve or nipple is threaded into the dispense fitment, the ring cutter is pushed through the bag membrane or, alternatively, the needle cuts the bag membrane as it moves through the plane of the membrane. The British Standard Pipe (BSP) threads are a fine thread which forms a reasonable seal while the nipple is threaded in and the membrane is punctured.

[0003] When using a bulk bin container, such as SpaceKraft® having a thick side wall and having 2" BSP thread in a soft fitment, often leads to cross-threading when trying to insert a dispense valve or nipple. This happens due to a number of factors such as 1) poor light in operations where the IBC will be dispensed and the fact that 2) the soft fitment tends to go out of round when resting against the side of the dispense hole in the container and 3) the general difficulty in starting soft fine threads. To overcome this problem, SpaceKraft® introduces the use of a buttress threaded dispense fitment. This fitment has a coarse thread which is very difficult to cross-thread. The fitment is also designed to resist going out of round. Although the buttress fitment solved the cross threading problem it created a new challenge and that was a means to puncture the bag membrane. To solve this problem, a cutter tool was created that threaded into the outlet side of the valve and with the valve open and in position it passed through the valve and punctured the membrane. The cutter tool was then retracted and the valve closed. When removing the cutter tool prior to installing an outlet fitting, a small amount of product had to be collected or was spilled on the floor.

[0004] In an attempt to eliminate the need for the cutter tool, the use a crown cutter with the buttress thread was developed. However, the problem here was that the coarse threads allowed a lot of product to leak while threading in the nipple and the membrane having been punctured. To overcome this problem, a special wiper seal that was a molded part of the buttress dispense fitment was made. However, this approach did not produce a complete seal and a small amount of product still was leaked out and was unacceptable for many customers and many products.

[0005] Accordingly, there is a need for an affordable, functional bulk container or intermediate bulk container (IBC) having a dispensing apparatus for discharging liquids and semi-liquid fluids from the container and is free from the disadvantages of the aforementioned dispensing system.

SUMMARY OF THE INVENTION

[0006] The improved intermediate bulk container (IBC) employs a buttress dispensing apparatus with internal sealing surface, special nipple or ring cutter assembly with sealing surfaces while threading the nipple in and the membrane is being punctured by the ring cutter.

[0007] This invention provides a solution to dispensing IBC bag liners that eliminates cross threading by using a coarse buttress thread and eliminates leakage when using an external cutter tool. The invention also eliminates leakage while threading in a buttress nipple when using a ring cutter. When comparing the use of a ring cutter and BSP threaded fitments, the present invention provides a seal that doesn't rely on the threads for the seal and eliminates the need for a ring cutter to be provided with each and every bag as it has been the practice. This invention thus eliminates a step in the dispensing process. Typically, when using a ring cutter one has to first removes the plug, removes the ring cutter, insert the ring cutter facing the membrane and then insert the valve and nipple into the dispense fitment. With the present invention, only remove the plug and insert the valve/nipple/cutter assembly.

[0008] Accordingly, one aspect of the present invention relates to a bulk bin and bag dispensing apparatus comprises a bag fitment having an elongated buttress female thread and a nipple adapted to be joined to the bag fitment. The nipple comprises an elongated body portion having an axial flow passage therethrough and a projection portion extends radially therefrom. The body portion further includes a first end and a second end. The first end is defined by male buttress thread thereto and the second end is defined by NPT thread thereto. The first end includes a ring cutter and at least one sealing means attached thereto so that the nipple stroke threaded within the elongated buttress female thread causing the ring cutter to puncture a bag membrane to thereby permit liquid to be dispensed through the flow passage.

[0009] Another aspect of the present invention relates to a dispensing apparatus for use with intermediate bulk container defined by a bag and box combination. The bag and box combination is comprised of a collapsible bulk bin and a bag flexible material. The dispensing apparatus comprises a bag fitment having an elongated buttress female thread. A first annular flange and a second annular flange are spaced axially from one another and each of which extends radially from the buttress female thread. A nipple is adapted to be joined to the
bag fitment. The nipple comprises an elongated body portion having an axial flow passage therethrough. The body portion further includes a first end and a second end defined by annular grooves. A projection portion extends radially between the first end and the second end. At least one O-ring seal is disposed onto the annular groove of the first end of the body portion. A ring cutter is adapted to be joined to the first end of the body portion. The nipple drives through the elongated buttress female thread puncturing the bag membrane to thereby permit liquid to be dispensed through the flow passage while the nipple seats inside the buttress female thread and forms a complete seal within the bag fitment prior to the ring cutter punctures the bag membrane.

[0010] One further aspect of the present invention relates to a dispensing apparatus for use with intermediate bulk container defined by a bag and box combination. The bag and box combination is comprised of a collapsible bulk bin and a bag flexible material. The dispensing apparatus comprises a bag fitment having an elongated buttress female thread. A first annular flange and a second annular flange are spaced axially from one another and each of which extends radially from the buttress female thread. A nipple is adapted to be joined to the bag fitment. The nipple comprises an elongated body portion having an axial flow passage therethrough wherein the body portion further includes a first end and a second end. The first end is defined by male buttress thread thereto and the second end is defined by NPT thread thereto. A projection portion extends radially between the first end and the second end. Two O-ring gaskets each of which is attached to respective opposed sides of the projection portion. Two O-ring seals are disposed onto the annular grooves of the first end of the body portion so as to completely seals the first end of the body portion within the buttress female thread. A ring cutter is adapted to be joined to the first end of the body portion. The first end of the body portion strokes radially within the elongated buttress female thread causing the ring cutter to puncture a bag membrane to thereby permit liquid to be dispensed through the flow passage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The foregoing, as well as other objects and advantages of the invention, will become apparent from the following detailed description when taken in conjunction with the accompanying drawings, wherein like reference characters designate like parts throughout the several views, and wherein:

[0012] FIG. 1 is a top perspective view of an intermediate bulk container (IBC) defined by a bag and box combination receiving a dispensing apparatus in accordance to the preferred embodiment of the invention;

[0013] FIG. 2 is an exploded top perspective view of the dispensing apparatus used with the intermediate bulk container (IBC) of FIG. 1 in accordance to the preferred embodiment of the invention;

[0014] FIG. 3 is the fully assembled top perspective view of the dispensing apparatus of FIG. 2;

[0015] FIG. 4 is a half sectional top perspective view of the dispensing apparatus shown in FIG. 3 to depict the interior thereof; and

[0016] FIG. 5 is a cross-sectional view of the dispensing apparatus taken along line 5-5 of FIG. 3.

DETAILED DESCRIPTION OF THE INVENTION

[0017] FIG. 1 is a top perspective view of an intermediate bulk container (IBC) 10 defined by a bag and box combination receiving a dispensing apparatus (not shown in FIG. 1) in accordance to the preferred embodiment of the invention. The bag and box combination is comprised of a rigid bulk bin or box 14 and a plastic bag 16 made of suitable flexible material such as plastic. One particularly suitable container for forming the rigid bulk bin 14 is sold by International Paper Company under the trademark SpaceKraft™. The bulk bin 14 is made from a continuously wound sleeve of linerboard and corrugated medium to create a package that is six to ten layers thick with no seam. This seamless construction has no manufacturing joint which offers extraordinary strength-up to 75,000 pounds of to-bottom compression strength without wood or metal components. However, one of ordinary skilled in the art would appreciate that the invention may also be used with other outer rigid bulk bin. The plastic bag is made of low density food grade polyethylene that can operate effectively from −20°C to more than +40°C. The plastic bag 16 is supported inside the bulk bin 14 for containing liquids or semi-liquid fluids. When filling the plastic bag 16 with a liquid, a filling valve is attached to its upper end to pour in liquid and then the plastic bag 16 is sealed with a removable cap 18. During dispensing the liquid from the plastic bag 16, the dispense fitment plug 17 is removed and a dispensing apparatus 12 is attached thereto to dispense the liquid from the plastic bag.

[0018] Referring to FIGS. 2-5, and particularly to FIG. 2 which is an exploded top perspective view of the dispensing apparatus 12 used with the intermediate bulk container (IBC) of FIG. 1 in accordance to the preferred embodiment of the invention. The dispensing apparatus 12 includes a nipple 20, two ring gaskets 22a, 22b, two O-ring seals 24a, 24b, a ring cutter 28 and a bag fitment 26. The nipple 20 is preferably made of glass filled nylon, polypropylene or PVC or alternatively a high density polyethylene. The bag fitment 26 each is preferably made of a relatively soft polyethylene material such that is easily welded to the polyethylene film used to form the bag 16. The nipple 20 includes a mating male thread body portion 30 that includes a radial projection portion 32 and an axial dispensing or flow passage 34 therethrough. The projection portion 32 extends radially from the body portion 30. The body portion 30 has a respective first and second threaded ends 35 & 36 and is provided with a pair of annular grooves 37 on the first end that receives O-ring seals 24a, 24b that cooperates with a cooperating face 38 of bag fitment 26 to seal the flow passage 34 when the dispensing apparatus 12 is moved from its open position clear of the flow passage 34 to a close position with the O-ring seals 24a, 24b encircling and forming a seal around the outer periphery of the flow passage 34. The first and second threaded ends 35 and 36 may have different outer diameter on opposed side of the projection portion 32. The ring gasket 22a is disposed on one side of the body portion 30 and the ring gasket 22b is disposed on the opposed side of the body portion 30 with respect to the ring gasket 22a as will be discussed hereinafter. The bag fitment 26 includes a buttress female thread 27 formed therein and is provided with a first annular flange 39 and a second annular mounting flange 40 that spaced axially from the first annular flange 39 and extends radially at the inner axial end of the bag fitment 26. The mounting flange 40 is mounted or otherwise secured to the plastic bag 16 around the full periphery of the mounting flange surface 41, i.e., to completely surround and
thus seal the flow passage 34. It will be noted that the mounting flange 40 of the bag fitment 26 extends through a hole in a bag liner so that the flange 40 is positioned within the bag liner i.e. the outside surface 41 of the flange 40 is in face to face relationship with and is secured in sealing relationship with the inner surface of the bag liner (not shown). The ring cutter 28 has an outer diameter slightly smaller than the inner diameter of the buttress female thread 27 so that it can removably drives through the bag fitment 26. The ring cutter 28 has a serrated cutting edge 42 that is used for puncturing through the membrane (not shown). The membrane is a separate piece of film that is welded across the bag of the bag fitment surface 41. The ring cutter 28 is made of but not limited to, hard plastic material such as polypropylene. One end of the nipple 20 having the ring cutter 28 attached thereto is threadedly attached to the bag fitment 26 and other end is threadedly attached to a valve system (not shown).

[0019] The dispensing apparatus 12 is constructed as depicted in FIG. 3 by placing the ring gasket 22a against the radial projection portion 32 and then each of the O-ring seals 24a, 24b is received in the first end of the annular grooves 37. Next the ring cutter 28 is attached to the first end of the nipple 20. Next, the side of the nipple 20 having the O-ring seals 24a, 24b and the ring cutter 28 is now threadedly inserted into the buttress female thread 27 of the bag fitment 26. Finally, positioning the gasket 22a against radial projection portion 32 of the other end of the dispensing apparatus 12 and the other end of the dispensing apparatus 12 is attached to the valve system (not shown).

[0020] FIG. 4 is a half sectional top perspective view of the dispensing apparatus shown in FIG. 3 to depict the interior thereof and FIG. 5 is a cross-sectional view of the dispensing apparatus taken along lines 5-5 of FIG. 3. It should be noted that the bag fitment 26 has a sealing surface 38 with an Internal Diameter (ID) less than or equal to the Internal Diameter (ID) of the bag fitment threads 27 and the nipple 20 has a sealing surface or multiple sealing surfaces 37 with o-ring gaskets 24a and 24b on it to mate up with the internal sealing surface of the bag fitment 38. The length of the bag fitment sealing surface and the nipple sealing surfaces should exceed the stroke of the nipple 20 threads such that a seal is maintained prior to the membrane being punctured and the nipple 20 is fully seated. Furthermore the ring cutter 28 is made so as to fit at the end of the nipple 20 in such that it doesn’t puncture the membrane prior to the nipple threads 36 engaging with the bag fitment 26 and the seals 24a, 24b engaging and yet fully puncture the bag membrane prior to the nipple threads 36 fully seating.

[0021] It should be noted that proper engagement of the nipple 20 with the bag fitment 26 is important in discharging the liquid from the bag 16 through the dispensing apparatus 12 without any leaks during operation and eliminating extra steps that had been the case in prior designed. To properly engage, the nipple 20 is inserted into bag fitment 26 such that nipple threads 36 engage with bag fitment threads 27 prior to the ring cutter 42 puncturing the membrane. The nipple 20 is threaded into the bag fitment 26 thus driving the ring cutter 28 forward and does so such that the first O-ring seal 24b in groove 37 makes contact with the bag fitment sealing surface 38 thus sealing off the flow passage 34 prior to the ring cutter 28 puncturing the membrane. The nipple 20 is thread in and the membrane is punctured. The nipple 20 is threaded in such that the second O-ring seal 24a in groove 37 makes contact with bag fitment sealing surface 38 at the while the first O-ring seal 24b is still in contact. The nipple 20 is threaded in completing the puncturing of the membrane until it is seated against the bag fitment 26 such that gasket 22b makes contact with projection 32 and the end of the bag fitment. While this is happening, the first O-ring seal 24b moves past the bag fitment sealing surface 38 and inside the bag 16 leaving the second O-ring seal 24a to maintain the seal until the gasket 22a forms a seal. For achieving the aforementioned engagement, the OD of the nipple surface adjacent to the grooves 37 must be smaller than the ID of the threads 27 in the bag fitment 26 to allow the nipple 20 to pass through. Therefore, in order to form a positive seal, the ID of the bag fitment sealing surface 38 should be slightly larger than the OD of the nipple 20 but also smaller than the ID of the threads 27. The gap is filled by the O-ring seals thus creating compression of the O-ring to form a seal.

[0022] The inventors of the present invention have re-designed the bag fitment 26 with the smaller internal sealing surface 38 and the nipple 20 is redesigned to accommodate the O-ring or elastomer over molded seals such that a positive seal is accomplished. The spacing of the grooves 37 had to be also smaller than the length of the sealing surface 38 to maintain a continuous seal and yet maintain a seal for the entire stroke of the nipple threads 36 to accomplish a complete puncture of the membrane. The thread stroke is approximately half inch while the sealing surface is less than half inch. This length was constrained so that the overall height of the bag fitment to be 1 ½" tall.

[0023] Alternative means for accomplishing the aforementioned steps would be to not put the grooves or o-rings in the nipple 20 but rather mold the bag fitment 26 with a seal built into the sealing surface 38 such that the nipple 20 makes continuous contact while it is being threaded in. This configuration may be easier to do as one would only need one seal and wouldn’t have to worry about the geometry of maintaining a seal. However this would create some practical challenges with regards to molding, i.e., making the wall thickness sufficient to hold a seal would cause some dimensional stability challenges.

[0024] In use, the dispense fitment plug 17 is removed and the first end of the dispensing apparatus 12 is attached to the bag 16 by means of the bag fitment 26 and the other end of the dispensing apparatus 12 is attached to a valve dispensor (not shown) to permit the discharge of liquid from the intermediate bulk container 10. Since the ring cutter 28 is attached to the end of nipple 20, thus as the nipple 20 moves toward the membrane, the ring cutter 28 moves to puncture the bag 16. At this point, the liquid can be transferred out from the bag 16 through the flow passage 34. To prevent liquid from being dispensed immediately after the bag membrane is punctured, the valve dispenser remains in closed position. To dispense liquid from the intermediate bulk container 10, the valve dispensor can be opened to permit liquid to flow from the bag 16 through the axial flow passage 34 in the dispensing apparatus 12 and out through the valve dispensor.

[0025] Although buttress threads are preferred in the invention, but one of ordinary skilled in the art would appreciate that other threads would work as well. The seals can be O-rings or over molded elastomer seals or any other gasket seal. Alternatively, the seal could also be molded into the dispensing apparatus. The height of the fitment isn’t critical so long as the geometry of the fitment/nipple and ring cutter match to accomplish a seal during the entire process of puncturing and sealing the nipple. The inventors envision the ring
cutter snapping over the end of the nipple such that it is free to rotate (important to cut the bag membrane correctly) but yet will hold the ring cutter in position while dispensing the liquid from the bag and will retrieve the ring cutter when retracting the nipple from the bag fitment. The design of the ring cutter to maximize the bore size and create a full cut with minimum stroke are important not critical to the invention.

[0026] While this invention is susceptible of embodiment in many different forms, there is shown, in the drawings, several specific embodiments with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiments illustrated. It will be understood that like or analogous elements and/or components, referred to herein, are identified throughout the drawings by like reference characters. In addition, it will be understood that the drawings are merely representations of the present invention, and some of the components may have been distorted from actual scale for purposes of pictorial clarity.

What is claimed is:

1. A bulk bin and bag dispensing apparatus comprising:
   a bag fitment having an elongated buttress female thread; and
   a nipple adapted to be joined to the bag fitment, the nipple comprising an elongated body portion having an axial flow passage therethrough and a projection portion extends radially therefrom, the body portion further includes a first end and a second end wherein the first end defined by male buttress thread thereto and the second end defined by NPT thread thereto, the first end includes a ring cutter and at least one sealing means attached thereto so that the nipple strokes threadedly within the elongated buttress female thread causing the ring cutter to puncture a bag membrane to thereby permits liquid to be dispensed through the flow passage.

2. The dispensing apparatus of claim 1 wherein the at least one sealing means includes two O-ring seals that are disposed on the first end of the body portion.

3. The dispensing apparatus of claim 1 further comprising two O-ring gaskets each of which is respectively attached to corresponding opposed sides of the projection portion.

4. The dispensing apparatus of claim 1 wherein the second annular flange is a mounting flange that is attached to a plastic bag contained in a bulk bin.

5. The dispensing apparatus of claim 1 wherein the nipple forms a complete seal within the bag fitment prior to the ring cutter punctures the bag membrane.

6. The dispensing apparatus of claim 1 wherein the second end of the body portion is attached to a valve to discharge the liquid from the bag.

7. A dispensing apparatus for use with intermediate bulk container defined by a bag and box combination wherein the bag and box combination is comprised of a collapsible bulk bin and a bag flexible material, the dispensing apparatus comprising:
   a bag fitment having an elongated buttress female thread, a first annular flange and a second annular flange spaced axially from one another and each of which extends radially from the buttress female thread;
   a nipple adapted to be joined to the bag fitment, the nipple comprising
   an elongated body portion having an axial flow passage therethrough wherein the body portion further includes a first end and a second end defined by annular grooves,
   a projection portion extends radially between the first end and the second end,
   at least one O-ring seal being disposed onto the annular groove of the first end of the body portion,
   a ring cutter being adapted to be joined to the first end of the body portion wherein the nipple drives through the elongated buttress female thread puncturing the bag membrane to thereby permits liquid to be dispensed through the flow passage while the nipple seats inside the buttress female thread and forms a complete seal within the bag fitment prior to the ring cutter punctures the bag membrane.

8. The dispensing apparatus of claim 7 wherein the at least O-ring seal includes two O-ring seals that are disposed on the first end of the body portion.

9. The dispensing apparatus of claim 7 dispensing fitment of claim 1 further comprising two O-ring gaskets each of which is respectively attached to corresponding opposed sides of the projection portion.

10. A dispensing apparatus for use with intermediate bulk container defined by a bag and box combination wherein the bag and box combination is comprised of a collapsible bulk bin and a bag flexible material, the dispensing apparatus comprising:
    a bag fitment having an elongated buttress female thread, a first annular flange and a second annular flange spaced axially from one another and each of which extends radially from the buttress female thread;
    a nipple adapted to be joined to the bag fitment, the nipple comprising
    an elongated body portion having an axial flow passage therethrough wherein the body portion further includes a first end and a second end wherein the first end defined by male buttress thread thereto and the second end defined by NPT thread thereto,
    a projection portion extends radially between the first end and the second end,
    two O-ring gaskets each of which attached to respective opposed sides of the projection portion,
    two O-ring seals being disposed onto the annular groove of the first end of the body portion so as to completely seals the first end of the body portion within the buttress female thread,
    a ring cutter being adapted to be joined to the first end of the body portion and wherein the first end of the body portion strokes threadedly within the elongated buttress female thread causing the ring cutter to puncture a bag membrane to thereby permit liquid to be dispensed through the flow passage.

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