

PATENT SPECIFICATION (11)

1 536 237

1 536 237

- (21) Application No. 22952/77 (22) Filed 31 May 1977 (19)
(61) Patent of Addition to No. 1 455 874 dated 6 Sept. 1973
(44) Complete Specification published 20 Dec. 1978
(51) INT. CL.² B65D 89/12
(52) Index at acceptance
B8K 2GX 2K4 2K6 2L 2M FB



(54) IMPROVEMENTS RELATING TO BULK MATERIAL CONTAINERS

(71) We, FRANK NATTRASS, of "Fallows End", Brearton, Nr. Harrogate, in the County of York, and PETER JOHNSON NATTRASS, of "Tresco", Chain Lane, Knaresborough, in the County of York, both British Subjects, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to containers for bulk material, particularly for comminuted material.

The use of large bags for transporting bulk quantities of powdered or granular material is known and it is known for such bags to have an inner liner and to empty the bag through a tube forming part of the liner and passing through an opening in the base of the bag. Our Patent No. 1,455,874 concerns a bag construction enabling the base of the bag to be closed completely, to prevent the contents thereof being contaminated, and the present invention concerns a modification of the invention claimed in that earlier patent. According to the present invention a bag for transporting bulk material comprises an outer bag member having a base section with an opening therein and side walls, means secured to upper parts of said side walls by way of which said bag may be lifted, an inner liner within said outer bag member, said inner liner having a lower end terminating in a tubular section, a tube secured to said base section around the opening and projecting outwardly from said base section, the tubular section extending through said opening into said tube, means releasably closing the tube and the tubular section adjacent to the opening, and further means for releasably closing the tube near the free end thereof with the tubular section retained wholly within the tube by said further releasable closing means.

In use the inner liner of such a bag is filled with material and the liner is then

closed at its upper end. Retaining of the tubular section of the lower end of the liner within the tube and the protection of this by the tube completely seals the base of the bag and so prevents contamination of the material within the bag. If required a separate releasable closing means may be affixed around the tubular section of the inner liner, or, more commonly, the lower end of this liner may be sealed by a welded joint. When the bag is to be emptied the tube is opened and the tubular section pulled therefrom. The welded end of the tubular section, if present, is then cut off and the tubular section secured around the entry tube to a receiving bin or other container. The first releasable closing means is then unfastened, together with any further closing means in the tubular section itself, whereupon the material can flow into the container with little or no material being released into the air. The outer bag member is re-usable, only the inner liner needing replacement.

Preferably the upper end of the inner liner is also of tubular form and extends beyond the upper end of the side walls of the outer bag member. After filling this gives sufficient free liner material to be folded over and tied off to form a waterproof closure for the liner.

Conveniently a fabric skirt is secured to the upper edges of the side walls of the outer bag member to overlie the liner, the skirt having a central opening through which part of the liner may pass. This is important as it ensures that the liner can be completely emptied of material merely by lifting the bag slightly while the lower end of the liner is secured to the container entry tube.

The invention will be better understood from the following description of a bag made in accordance therewith, read in conjunction with the accompanying drawings, in which:—

Figure 1 is a schematic view of the bag in a position ready for filling;

Figure 2 shows the detail of the top section of the bag after filling;

Figure 3 shows a side elevation of the bag; and

Figures 4 to 7 show different stages of discharging the contents of the bag.

5 As shown in the Figures a bag comprises an outer bag member 1 having a base section 2 with an opening 3 therein and side walls 4. Four lifting loops such as 5 are stitched to the upper parts of the side walls. Other means by way of which the bag may be lifted can be used, but loops are preferred, and the preferred method of securing these to the bag is as described in Application No. 15798/73 (Serial No. 1,431,581). To provide a single point lift the loops at two adjacent corners may be interlocked or otherwise joined together, and the loops at the other two adjacent corners may also be interlocked or joined. A cross strap is then secured around the two sets of joined loops to extend across the top of the bag and provide a lifting point engageable by a single lifting element.

25 Fitting within the outer bag member is an inner liner 6 which may conveniently be made of impervious plastics material. The upper end of the liner extends through a central opening formed in the skirt 7 which is an annular piece of fabric stitched to the upper ends of the side walls 4. Secured to one of the side walls 4 is a lid 8 which is formed with slots 9 through which the loops 5 may be passed.

35 After the bag is filled an upper tubular part 10 of the inner liner 6 is folded back upon itself in swan-neck form as shown in Figure 2 to give a waterproof closure to the liner. The folded part of the swan-neck closure lies within the skirt 7 and is tied off and secured to the skirt by a cord 11. The outer lid 8 is then fitted over the skirt to give additional protection. In its filled form the bag can be transported and stacked as desired.

45 At its lower end the bag has a short tube 12 stitched to the base of the bag around the opening 3. The tube is conveniently made from the same fabric as the outer bag member. A tubular section 13 (which is closed at its lower end by welding 14) passes through the opening and the tube 12. To close the lower end of the bag the tube 12 and the tubular section within are closed by a releasable fastening means 15 passed round the tube 12 and tightened to constrict the tube together with the tubular section of the liner. After this tying off operation the remainder of the tubular section 13 of the liner is rolled up and tucked into the free end of the tube 12. Subsequently a further fastening means 16 is secured around the free end of the tube 12 so that the base of the bag is sealed off and the vulnerable end of the inner liner is enclosed.

65 When the contents of the bag are to be

discharged the bag is lifted into position above an entry tube 17 to a receiving container 18 with the tube 12 lying above the entry tube 17. The fastener 16 is untied and discarded and the end of the tubular section 13 is unfolded and pulled into position as shown in Figure 5. The welded end 14 of the section is then cut off and the section placed around the entry tube 17 and tied in position thereon by cord 19. The fastening means 15 is now removed whereupon the contents of the bag will flow into the container 18. The fact that the section 13 is tied around the entry tube 17 prevents any of the material escaping into the atmosphere. If a slower rate of discharge from the bag is required the fastening means 15 may be merely loosened rather than completely removed.

75 With certain material it is possible that when the bag is almost discharged some small pockets of material may remain in the lower corners of the bag, as indicated at 20 in Figure 6, the amount of material left depending on the natural angle of repose of that material. If this happens this remaining quantity of material can be discharged by raising the bag through a further small distance. The tying of the upper end of the liner 6 to the skirt 7 and the anchorage of the lower end of the liner 13 to the entry tube 17 will mean that on raising the bag the liner is forced to take on a more elongated position as shown in Figure 7 so that all remaining material will pass into the container 18.

85 The releasable fastening means may simply be cords tied round the tube, but more preferably are fasteners of a plastics material having locking means whereby any tension put in the fastener is automatically retained.

90 The invention provides a container for bulk material which is simple to handle, is re-usable, ensures good protection of the material and is capable of being completely emptied without discharging any material into the atmosphere.

95 The preferred material for the outer bag member is woven unpigmented polypropylene, which may be subject to degradation by ultraviolet light. To retard this degradation the bag may be fitted with a shroud for shielding the outer bag member from ultraviolet light.

WHAT WE CLAIM IS:—

1. A bag for transporting bulk material comprising an outer bag member having a base section with an opening therein and side walls, means secured to upper parts of said side walls by way of which said bag may be lifted, an inner liner within said outer bag member, said inner liner having a lower end terminating in a tubular section, 125 130

Figure 3 shows a side elevation of the bag; and

Figures 4 to 7 show different stages of discharging the contents of the bag.

5 As shown in the Figures a bag comprises an outer bag member 1 having a base section 2 with an opening 3 therein and side walls 4. Four lifting loops such as 5 are stitched to the upper parts of the side walls. Other means by way of which the bag may be lifted can be used, but loops are preferred, and the preferred method of securing these to the bag is as described in Application No. 15798/73 (Serial No. 1,431,581). To provide a single point lift the loops at two adjacent corners may be interlocked or otherwise joined together, and the loops at the other two adjacent corners may also be interlocked or joined. A cross strap is then secured around the two sets of joined loops to extend across the top of the bag and provide a lifting point engageable by a single lifting element.

25 Fitting within the outer bag member is an inner liner 6 which may conveniently be made of impervious plastics material. The upper end of the liner extends through a central opening formed in the skirt 7 which is an annular piece of fabric stitched to the upper ends of the side walls 4. Secured to one of the side walls 4 is a lid 8 which is formed with slots 9 through which the loops 5 may be passed.

35 After the bag is filled an upper tubular part 10 of the inner liner 6 is folded back upon itself in swan-neck form as shown in Figure 2 to give a waterproof closure to the liner. The folded part of the swan-neck closure lies within the skirt 7 and is tied off and secured to the skirt by a cord 11. The outer lid 8 is then fitted over the skirt to give additional protection. In its filled form the bag can be transported and stacked as desired.

45 At its lower end the bag has a short tube 12 stitched to the base of the bag around the opening 3. The tube is conveniently made from the same fabric as the outer bag member. A tubular section 13 (which is closed at its lower end by welding 14) passes through the opening and the tube 12. To close the lower end of the bag the tube 12 and the tubular section within are closed by a releasable fastening means 15 passed round the tube 12 and tightened to constrict the tube together with the tubular section of the liner. After this tying off operation the remainder of the tubular section 13 of the liner is rolled up and tucked into the free end of the tube 12. Subsequently a further fastening means 16 is secured around the free end of the tube 12 so that the base of the bag is sealed off and the vulnerable end of the inner liner is enclosed.

65 When the contents of the bag are to be

discharged the bag is lifted into position above an entry tube 17 to a receiving container 18 with the tube 12 lying above the entry tube 17. The fastener 16 is untied and discarded and the end of the tubular section 13 is unfolded and pulled into position as shown in Figure 5. The welded end 14 of the section is then cut off and the section placed around the entry tube 17 and tied in position thereon by cord 19. The fastening means 15 is now removed whereupon the contents of the bag will flow into the container 18. The fact that the section 13 is tied around the entry tube 17 prevents any of the material escaping into the atmosphere. If a slower rate of discharge from the bag is required the fastening means 15 may be merely loosened rather than completely removed.

70 With certain material it is possible that when the bag is almost discharged some small pockets of material may remain in the lower corners of the bag, as indicated at 20 in Figure 6, the amount of material left depending on the natural angle of repose of that material. If this happens this remaining quantity of material can be discharged by raising the bag through a further small distance. The tying of the upper end of the liner 6 to the skirt 7 and the anchorage of the lower end of the liner 13 to the entry tube 17 will mean that on raising the bag the liner is forced to take on a more elongated position as shown in Figure 7 so that all remaining material will pass into the container 18.

75 The releasable fastening means may simply be cords tied round the tube, but more preferably are fasteners of a plastics material having locking means whereby any tension put in the fastener is automatically retained.

80 The invention provides a container for bulk material which is simple to handle, is re-usable, ensures good protection of the material and is capable of being completely emptied without discharging any material into the atmosphere.

85 The preferred material for the outer bag member is woven unpigmented polypropylene, which may be subject to degradation by ultraviolet light. To retard this degradation the bag may be fitted with a shroud for shielding the outer bag member from ultraviolet light.

WHAT WE CLAIM IS:—

1. A bag for transporting bulk material comprising an outer bag member having a base section with an opening therein and side walls, means secured to upper parts of said side walls by way of which said bag may be lifted, an inner liner within said outer bag member, said inner liner having a lower end terminating in a tubular section, 130

(12)

5 a tube secured to said base section around the opening and projecting outwardly from said base section, the tubular section extending through said opening into said tube, means releasably closing the tube and the tubular section adjacent to the opening, and further means for releasably closing the tube near the free end thereof with the tubular section retained wholly within the tube by said further releasable closing means.

10 2. A bag according to claim 1 in which the upper end of the liner is also of tubular form and extends beyond the upper end of the side walls of the outer bag member.

15 3. A bag according to claim 1 or claim 2 in which a fabric skirt is secured to the

upper edges of the side walls of the outer bag member to overlie the liner, the skirt having a central opening through which part of the liner may pass.

4. A bag for transporting bulk material substantially as herein described with reference to the accompanying drawings.

UROUHART-DYKES & LORD,

Chartered Patent Agents,

Agents for the Applicants.

11th Floor, Tower House, Merriion Way,
Leeds LS2 8PB,

and

11th Floor, St. Martin's House,

140 Tottenham Court Road,

London W1P 0JN.

20