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(54) **Storage bag.**

(57) A storage bag has lifting means comprising at least two handles having openings to accommodate the forks of a fork lift truck, the handles having extensions, which may be loops, which are capable of engaging lifting means for example a crane hook, at a single point above the bag.

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Storage Bag

THE PRESENT INVENTION RELATES to a storage bag for solid material in particular to such a bag provided with improved lifting means.

5 In recent years there has developed an increasing need for containers which can be used to transport relatively large amounts eg a tonne of powdered solid material. The containers often have to be transported long distances and to parts of the world from which they are unlikely to be returned, so although they must be of robust  
10 construction they must also not be expensive. These requirements are met by bags made from a durable material such as polypropylene.

The large bags when packed with powder are often stored in a warehouse or stacked into a conventional container wagon in which they are taken to and from a ship in which they are transported.

15 It will be appreciated that to lift, carry and stack such bags when full a mechanical aid such as a fork lift truck or crane must be used particularly as the bags are generally stacked more than one layer high.

The filler of the bags cannot always know how his customer.  
20 will move them on receipt so it is desirable that the bag should be adapted to be lifted by both fork lift truck and by crane. Conventionally, the lifting means comprises two or more, usually four, loops located around the periphery of the top of the bag so that a fork lift truck can lift the bag by slotting each arm of the fork  
25 through a loop, the loops being sufficiently long to fit over a crane hook suspended over the centre of the top of the bag.

The disadvantage of this method of lifting the bag lies in the need to provide for both fork lift and crane lifting because in order for the loops to be long enough to engage the crane hook they  
30 are too long for efficient manoeverability of the fork lift truck. In particular, when the bags are to be stacked in an enclosed space eg a container wagon using a fork lift truck there is difficulty in obtaining the necessary clearance between the top of the bag and the roof of the enclosure to allow for the length of the loop. Ideally  
35 for fork lift operation the loops should be close to the upper periphery of the bag when full but in such a case they would be too short to meet a crane hook suspended over the centre of the top of the bag.

We have now devised improved lifting means for a bag which can be used with a fork lift truck or a crane.

According to the invention a storage bag comprises lifting means which comprises at least two and preferably four handles having  
5 openings adapted to accomodate the forks of a fork lift truck close to the bag when the bag is carried thereby, at least two of the handles comprising extensions capable of engaging lifting means, for example a hook of a crane, at a single point above the bag.

The extensions may be for example hooks secured at one end  
10 to the handles but are preferably connections which comprise openings for engaging the said lifting means and which are secured to the handles. The handles are usually disposed around the periphery of the top of the bag which may be for example of rectangular, oval or circular cross-section. There are preferably four handles which may  
15 be disposed at the corners of a rectangular for example square topped bag or equidistant around the periphery of one of oval or circular cross-section.

The handles may be in the form of straps with two or more holes punched along the length of the strap each hole being reinforced  
20 to receive and sustain the suspended weight of the bag. Preferably however the handles comprise two or more interconnected loops of which one is attached to or formed integral with the bag. It has been found most practical for the handles to have two loops the first of which is attached to, or formed intergral with the bag and is  
25 adapted to engage the forks of the fork lift truck. The second loop is then of such a length that it extends sufficiently far to engage a crane hook suspended over the centre of the top of the bag. It is also advantageous for the first loops to be sufficiently rigid so that they stand up from the bag top so facilitating the engagement  
30 of the arms of the fork lift. The second loop on the contrary is preferably sufficiently flexible to be manipulated over the crane hook.

Although it is possible for the loops of a chain type handle to be disengageable from each other at will, in practice it has been  
35 found that the stress on each loop of the chain is such that for safety reasons each loop should be continuous with no weak point.

Thus if the second loop is made from polyester belting the ends which are joined to form the loop should be permanently stitched together. In this way they are able to sustain for example a 5 tonne weight which, for safety reasons, is prescribed when one tonne containers  
5 are to be lifted.

An advantage of the invention lies in the fact that during filling, the bag may if it has four handles and extensions be suspended by the extensions from four points such that when full a fork lift truck can remove the bag by engaging the handles without  
10 needing to disengage the extensions. In this way the need for a pallet or other lifting aid is avoided.

The invention will now be further described by reference to the following drawing of a container according to the invention.

The container (1) is a woven polypropylene bag and is  
15 rectangular in cross-section, the rectangle being 0.97 m long and 0.89 m wide. The length of the bag is 1.05 m. The bag is provided with four integral loops (2) (effective diameter for engagement purposes 29.3 cms) located at each corner of the rectangular end. Through each loop (2) is threaded a loop (3) (diameter 24.2 cms) of  
20 stitched polyester belting (4.5 cms wide). The bag has a tube (4) for filling purposes and an outlet spout 5.

The loops (2) are fairly rigid and stand up from the edge of the bag. They are adapted to receive the two arms of the fork of a fork lift truck, the arms usually engaging two loops each.  
25 The loops (3) are relatively flexible and can be extended as shown to fit over a crane hook suspended over the centre of the end of the bag.

The container according to the invention may be used to transport solid powders in bulk, in particular it is useful for the  
30 transport of terephthalic acid and fertilisers.

1. A storage bag which comprises lifting means which comprises at least two handles having openings adapted to accomodate the forks of a fork lift truck close to the bag when the bag is carried thereby, at least two of the handles comprising extensions capable of engaging lifting means at a single point above the bag.
2. A storage bag according to claim 1 which comprises four handles having openings adapted to accomodate the forks of a fork lift truck close to the bag when the bag is carried thereby.
3. A storage bag as claimed in claim 1 or 2 in which all of the handles comprise extensions capable of engaging lifting means at a single point above the bag.
4. A storage bag as claimed in claim 1, 2 or 3 in which the extensions are capable of engaging a hook of a crane.
5. A storage bag as claimed in any preceding claim in which the handles are disposed around the periphery of the top of the bag.
6. A storage bag as claimed in any preceding claim in which each extension comprises a loop interlinked with its handle.
7. A storage bag as claimed in any preceding claim in which the handles are sufficiently stiff to stand up from the top of the bag to present openings for the arms of the fork lift truck.
8. A process of filling a storage bag as claimed in any preceding claim which comprises four handles and extensions which comprises suspending the bag by the extensions from four points, filling the bag, engaging the handles with the arms of a fork lift truck without disengaging the extensions, and subsequently removing the bag with the fork lift truck.
9. A process of transporting particulate materials which comprises packing them in a storage bag as claimed in any of claims 1 to 7 and moving the bag by its handles and extensions using a fork lift truck and crane respectively.
10. A pack which comprises terephthalic acid contained in a storage bag as claimed in any of claims 1 to 7.

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