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Remarks:

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(54) **Packing bag for transporting pell-mell material in containers**

(57) It is described a packing bag (1) to be placed in a container, formed by a tubular body (2) made of plastic material closed at its ends by welded closing surfaces (3, 4), containing, in combination:

- coupling means (5) in order to hang the bag (1) inside the container;
- a closing bulkhead (6), made of a stiff material and applied to one of the closing surfaces (3);
- at least an inlet opening (7), applied to the upper part of the closing surface also containing the closing bulkhead (6), and at least an outlet opening (8) applied to the lower part of said closing surface (3);
- fixing means (9) connecting the bag (1) to an end of the container, applied to the closing surface (4) facing the closing surface (3) containing the closing bulkhead (6).

The bag (1) has a cross section substantially corresponding to the section of the container and it can further comprise a plurality of stiffening bars of the closing bulkhead (6).

The inlet and outlet (7, 8) are preferably made of tubular bodies of plastic material.

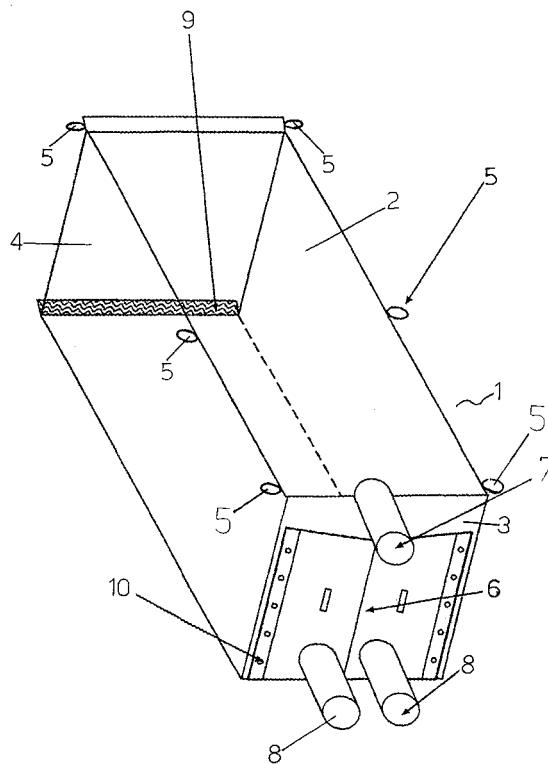


FIG. 1

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a packing bag to be placed in a container in order to transport pell-mell material, consisting of a tubular body, made of plastic material and closed at both ends by closing surfaces welded to the tubular body: a bulkhead made of stiff material, an inlet opening and at least an outlet opening are provided a closing surface.

PRIOR ART

[0002] Polyethylene (or another plastic material having equivalent working features) bags are generally considered the most advanced and advantageous packing means for transporting pell-mell material inside a container, since they allow the automatic loading and unloading of said material in the packing and transfer steps.

[0003] In the present description the word "container" indicates, besides the proper containers, any other rigid container (semi trailers, wagons, etc.) apt to transport pell-mell material and having a shape and a size substantially analogous to a container, and, preferably, an inlet door placed only at one of its ends (the front end or the rear end).

[0004] The packing bags presently used satisfy one of the main requirements of this kind of packaging, namely the fact of "containing" the pell-mell material thus avoiding its dispersion, but they still have some remarkable drawbacks.

[0005] The known bags, made of polyethylene, are difficult to install; in fact, the unfolding of these bags and their correct positioning inside the container takes (or can take) a long time and the use of skilled persons and it can therefore turn up to be difficult and expensive.

[0006] If the bag does not perfectly adheres to the container walls, air bubbles can remain between the bag and the container walls, said bubbles being difficult to remove and jeopardizing a perfect utilization of the loading capacity of said container.

[0007] Furthermore, the loading step is (or can be) very low and dangerous since the bag usually bulges during the turning over of the container and/or the opening of its door: therefore, pockets of material are formed which must be emptied with empirical means and which can break, letting outside the content of the bag. Moreover, said bags are potentially dangerous for the workers carrying out the unloading step, because they could be run over by the pell-mell material if the bag breaks.

[0008] Finally, if the known polyethylene bags are used for transporting a material which is different from polyethylene (for example polypropylene) they must be disposed as waste, since they cannot be regenerated and re-introduced into the polyethylene production cycle.

[0009] The object of the present invention is a packing bag for transporting pell-mell material in a container, said material lacking the present limits and drawbacks of the known packing bags.

SUMMARY OF THE INVENTION

[0010] It is an object of the present invention a packing bag for transporting pell-mell material in a container, formed by a tubular body made of plastic material, closed by closing surfaces welded to the ends of said body, having a cross-section corresponding to the internal section of the container and comprising at least:

- coupling means, applied to the upper part of the tubular body in order to hang the bag inside the container;
- a closing bulkhead, made of a stiff material and applied to one of the closing surfaces;
- at least an inlet opening, applied to the upper part of the closing surface also containing the closing bulkhead, and at least an outlet opening applied to the lower part of said closing surface;
- fixing means connecting the bag to an end of the container, applied to the closing surface facing the one containing the closing bulkhead.

[0011] Preferably, but not necessarily, the bag further comprises a plurality of stiffening bars for the closing bulkhead, whose ends are located in seats, made according to known ways, on the opposite sides of the said bulkhead.

DETAILED DESCRIPTION

[0012] The present invention will be better described hereinafter with reference to the alleged figure, showing a (non limitative) embodiment of a packing bag for transporting pell-mell material in a container, carried out according to the present invention.

[0013] The packing bag 1 is formed by a tubular body 2 made of plastic material, closed by closing surfaces 3, 4 welded to its ends, which has a cross section corresponding to the internal section of the container and comprises at least:

- coupling means 5, applied to the upper part of the tubular body 2 in order to hang the bag 1 inside the container;
- a closing bulkhead 6, made of a stiff material and applied to one 3 of the closing surfaces in order to avoid the bag 1, or at least the closing surface 3, to bulge during the turning over and/or the opening of the container;
- at least an inlet opening 7, applied to the upper part of the closing surface 3 also containing the closing bulkhead 6, and at least an outlet opening 8 (two outlet openings in the present embodiment) applied

to the lower part of said closing surface 3; the inlet and outlet openings are advantageously formed by tubular bodies made of plastic material, provided with closing means (not described), already known and not belonging to the present invention;

- fixing means 9 connecting the bag 1 to an end of the container, applied to the closing surface 4 facing the closing surface 3 containing the closing bulkhead 6.

[0014] Preferably, but not necessarily, the bag 1 also comprises a plurality of bars (not shown in the alleged drawing for simplicity's sake) stiffening the bulkhead 6. The ends of said bars, advantageously formed by iron bars having a square, rectangular or round section, are placed in seats 10 made by known ways on the opposite sides of the closing bulkhead 6. In the preferred embodiment shown in the alleged figure, the inlet opening 7 is placed between the area belonging both to the tubular body 2 and to the closing surface 3 so that the flow of pell-mell material entering the bag 1 is evenly distributed between the area adjacent to the closing surface 4 and the area adjacent to the closing surface 3, thus optimising the distribution of the pell-mell material in bag 1.

[0015] Advantageously, the tubular body 2, the closing surfaces 3, 4 and the inlet and outlet openings 7, 8 are made of a polymeric material, preferably but not necessarily formed by a mixture of low density polyethylene and linear polyethylene with octene, or by a mixture of polypropylene and linear polyethylene with octene. Preferably, the tubular body 2 and the inlet and outlet openings 7, 8 are made by hot extrusion of said polymeric material.

[0016] Particularly, the tubular body 2 and the closing surfaces 3, 4 are made of a film of a multilayered (co-extruded or mono-extruded) polymeric material having a thickness of 200 microns, or anyway comprised between 100 and 300 microns, whereas the inlet and outlet openings 7, 8 are made of a mono-extruded polymeric material having a thickness of 140 microns, or anyway comprised between 100 and 200 microns.

[0017] Preferably, the film of multilayered polymeric material forming the tubular body 2 and the closing surfaces 3, 4 has a shock resistance, measured according to the testing method ASTM 1709, higher than 150 grams (or anyway comprised between 150 and 300 grams) on the folds, a shock resistance higher than 200 grams (or anyway comprised between 200 and 500 grams) on the closing surfaces (3,4).

[0018] Advantageously, the coupling means 5 hanging the bag 1 inside the container are formed by a plurality of polypropylene raffia rings anchored to the upper part of the tubular body 2 by means of a weft ribbon having a high resistance.

[0019] The closing bulkhead 6 is advantageously made of polyethylene, polypropylene or corrugated board.

[0020] In the embodiment shown in the alleged figure,

means 9 allowing the bag 1 to be connected to an end of the container, thus avoiding its slipping out of the container during the turning over and/or the opening of said container, are formed by a wood panel applied to the closing surface 4 of the bag 1 facing the one 3 containing the closing bulkhead 6.

[0021] In a preferred embodiment, the folded tubular body 2, the fixing means 9 and, possibly, the stiffening bars are all part of a mounting kit closed in an envelope provided with handles (or other equivalent means) making its transfer easy. Said envelope, once open, forms the closing bulkhead 6.

[0022] A bag 1 made according to the present invention has remarkable advantages if compared to the known bags, among which:

- an increased easiness of installation thanks to the presence, in the mounting kit, of the folded tubular body 2, of the fixing means 9, of the closing bulkhead 6 and, possibly, of the stiffening bars of the closing bulkhead 6;
- a simpler use of the bag, which can be easily unfolded and suspended inside the container without forming folds and/or cuffs;
- optimisation of the loading capacity, since no air bubbles remain between the bag and the walls of the container, thus jeopardizing a perfect utilization of the loading capacity of said container.
- more security during the unloading step, since the closing bulkhead avoid the accidental turning over of the load on the operator;
- the possibility of unloading the whole content of the bag, without forming leftovers in corners, folds or pockets of the bag;
- great compatibility of use for the transfer of loose food products such as wheat, corn, etc.

[0023] Furthermore, if it is made of polypropylene, the bag 1 offers some further advantages, such as having a better environmental compatibility, since it is completely recyclable, better mechanical characteristics and an improved resistance to external agents and to the shocks.

[0024] Finally, a bag 1 made of polypropylene or of polyethylene and used for transporting polypropylene, respectively polyethylene, is recyclable in the same plant which produced it.

[0025] Without leaving the scope of the invention, a person skilled in the art can carry out on the packing bag for transporting pell-mell material object of the present invention all modifications and improvements suggested by the common experience and by the natural advance of technology.

Claims

1. Packing bag (1) for transporting pell-mell material

in a container, formed by a tubular body (2) made of plastic material and closed by closing surfaces (3, 4) welded to the ends of said tubular body (2), **characterized in that** it has a cross section corresponding to the internal section of the container and **in that** it comprises at least:

- coupling means (5), applied to the upper part of the tubular body (2) in order to hang the bag (1) inside the container;
- a closing bulkhead (6), made of a stiff material and applied to one (3) of the closing surfaces;
- at least an inlet opening (7), applied to the upper part of the closing surface (3) also containing the closing bulkhead (6), and at least an outlet opening (8) applied to the lower part of said closing surface (3);
- fixing means (9), connecting the bag (1) to an end of the container, applied to the closing surface (4) facing the closing surface (3) containing the closing bulkhead (6).

2. Bag (1) according to claim 1, **characterized in that** it further comprises a plurality of stiffening bars in the closing bulkhead (6), the ends of said bars being placed in seats (10) on the opposite sides of the closing bulkhead (6).

3. Bag (1) according to claim 1, **characterized in that** the inlet (7) and the outlet (8) openings are formed by tubular bodies made of plastic material.

4. Bag (1) according to claim 1, **characterized in that** the inlet opening (7) is between the area belonging to both the tubular body (2) and the closing surface (3) on which it is applied.

5. Bag (1) according to claims 1 and 3, **characterized in that** the tubular body (2), the closing surfaces (3, 4) and the inlet and outlet openings (7, 8) are made of a polymeric material.

6. Bag (1) according to claim 5, **characterized in that** the tubular body (2) and the inlet and outlet openings (7, 8) are made by hot extrusion of said polymeric material.

7. Bag (1) according to claim 5, **characterized in that** said polymeric material is formed by a mixture of low density polyethylene and linear polyethylene with octene.

8. Bag (1) according to claim 5, **characterized in that** said polymeric material is formed by a mixture of polypropylene and linear polyethylene with octene.

9. Bag (1) according to claim 5, **characterized in that** the tubular body (2) and the closing surfaces (3, 4)

are made of a film of multilayered polymeric material.

10. Bag (1) according to claim 9, **characterized in that** the film of multilayered polymeric material has a thickness comprised between 100 and 300 microns.

11. Bag (1) according to claim 10, **characterized in that** the film of multilayered polymeric material has a thickness of 200 microns.

12. Bag (1) according to claim 9, **characterized in that** the film of multilayered polymeric material has a shock resistance comprised between 150 and 300 grams on the folds and a shock resistance comprised between 200 and 500 grams on the closing surfaces (3, 4).

13. Bag (1) according to claim 12, **characterized in that** the film of multilayered polymeric material has a shock resistance higher than 150 grams on the folds and a shock resistance higher than 200 grams on the closing surfaces (3, 4).

14. Bag (1) according to claim 5, **characterized in that** the inlet and outlet openings (7, 8) are made of a film of mono-extruded polymeric material.

15. Bag (1) according to claim 14, **characterized in that** the film of mono-extruded polymeric material has a thickness comprised between 100 and 200 microns.

16. Bag (1) according to claim 15, **characterized in that** the film of mono-extruded polymeric material has a thickness of 140 microns.

17. Bag (1) according to claim 1, **characterized in that** the coupling means (5) of the bag (1) inside the container are made of plurality of polypropylene raffia rings.

18. Bag (1) according to claim 17, **characterized in that** the polypropylene raffia rings are anchored to the upper part of the tubular part (2) by means of a weft ribbon having a high resistance.

19. Bag (1) according to claim 1, **characterized in that** the closing bulkhead (6) is made of polyethylene, polypropylene or corrugated board.

20. Bag (1) according to claim 1, **characterized in that** the fixing means (9) of the bag (1) at one end of the container are formed by a wood panel applied to the closing surface (4) of the bag (1) facing the closing surface (3) on which the closing bulkhead (6) is applied.

21. Bag (1) according to claim 2, **characterized in that** the bars stiffening the bulkhead (6) are iron bars.

22. Bag (1) according one of the previous claims, **characterized in that** at least the folded tubular body (2) and the fixing means (9) are provided being closed in a envelope provided with means apt to ease its transfer, said envelope, once open, forming the closing bulkhead (6).

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23. Bag (1) according to claim 22, **characterized in that** also the stiffening bars of the closing bulkhead (6) are placed in the envelope.

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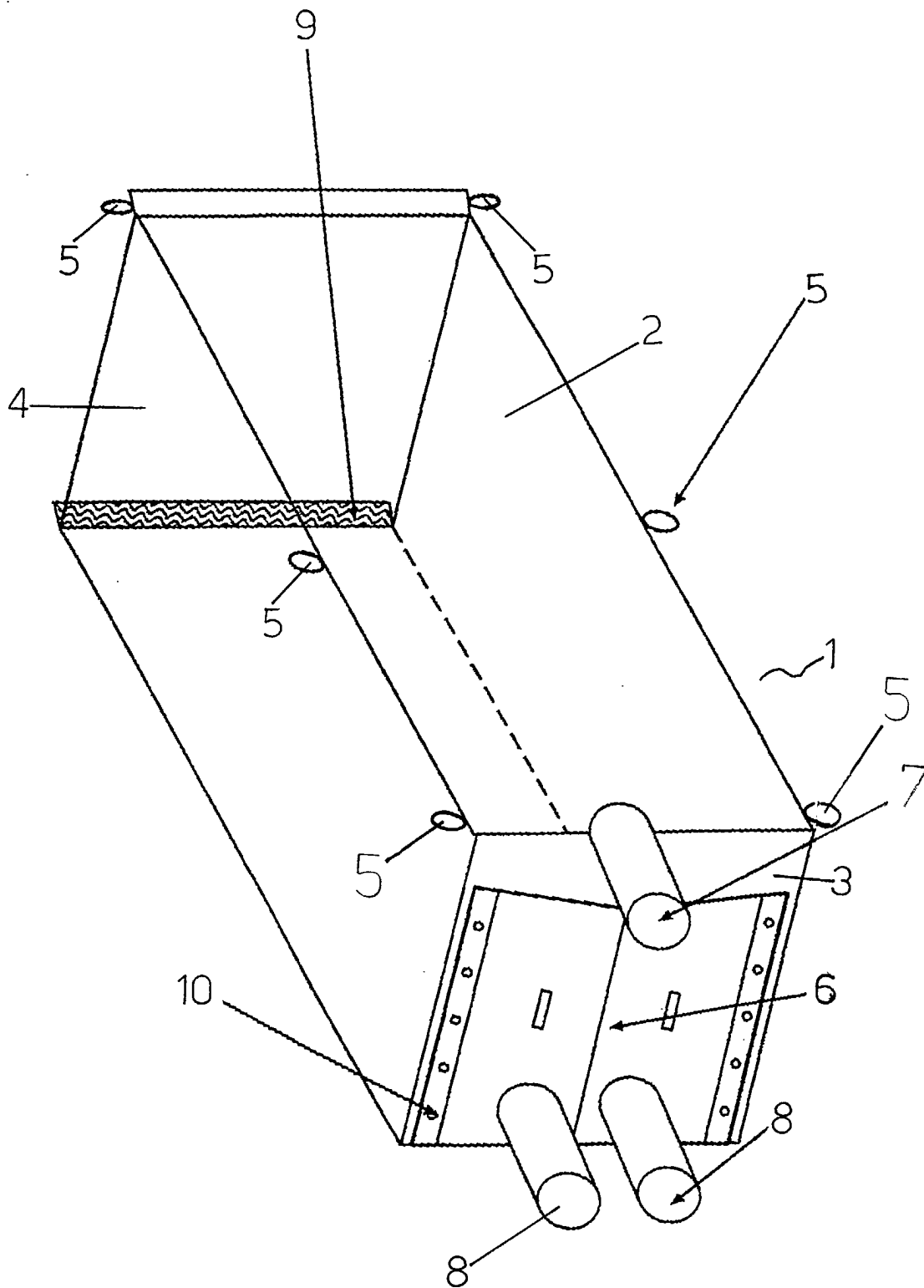


FIG. 1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 12 3749

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		30 January 2002	Van Rolleghe, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P0401)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 01 12 3749

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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