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(54) **ENHANCED PLASTIC NET BAG**

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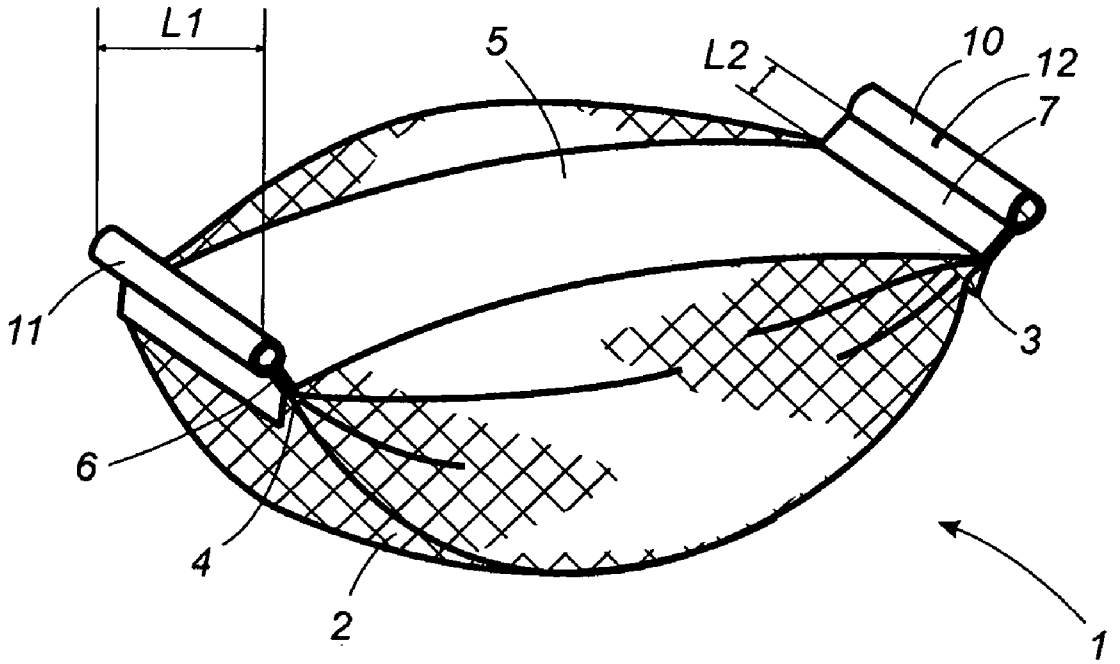
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(57) **ABSTRACT**

An enhanced plastic net bag is provided and is configured to be used for the commercialization of food products. The bag has a longitudinal axis and at least one end. The bag includes a tubular mesh body fabricated at least partially of plastic material; and at least one laminar strip having at least one end. A closure is formed by an enveloping association between the at least one end of the tubular mesh body and the at least one end of the laminar strip by laying the laminar strip over the tubular mesh body and folding both the laminar strip and the tubular mesh body. The laminar strip is heat sealed to the tubular mesh body to form at least one heat weld wherein the at least one heat weld is transverse to the longitudinal axis. The at least one heat weld comprises a fused mass comprising at least two layers of the laminar strip and at least two layers of the tubular mesh body.



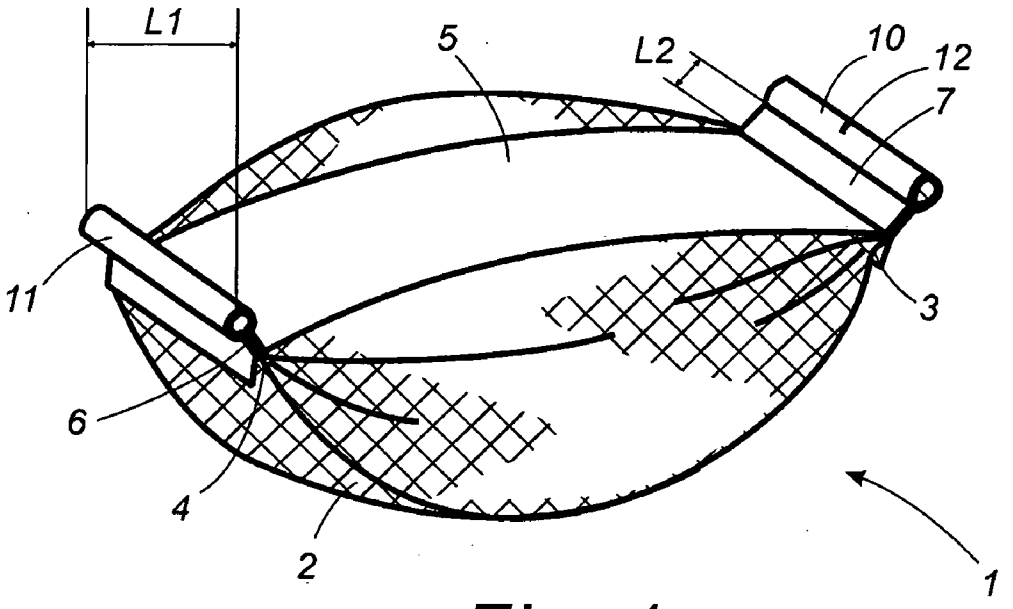


Fig. 1

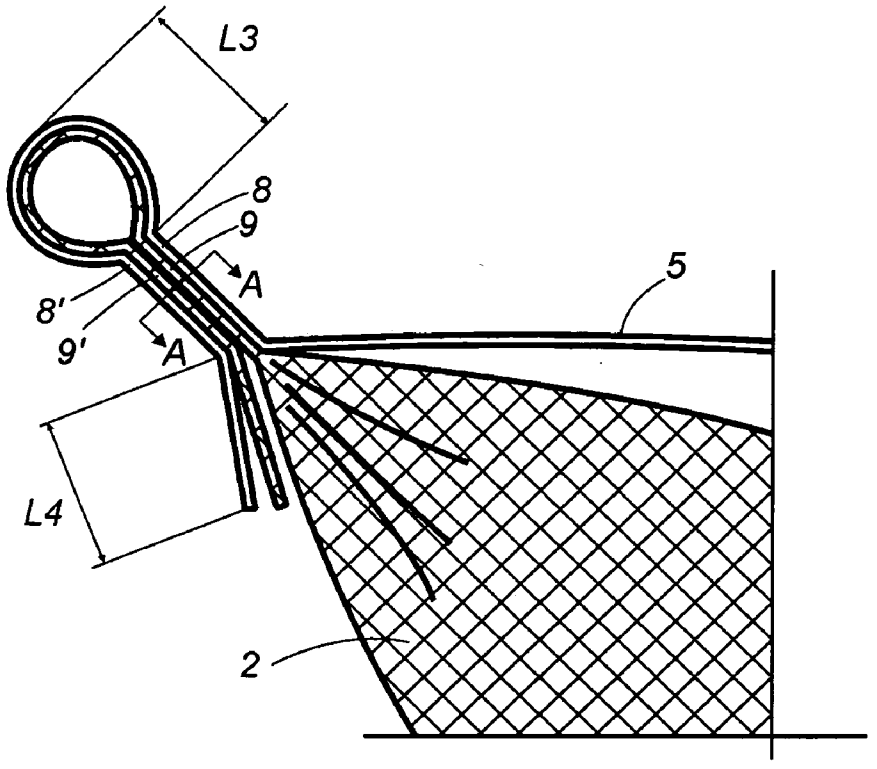


Fig. 2

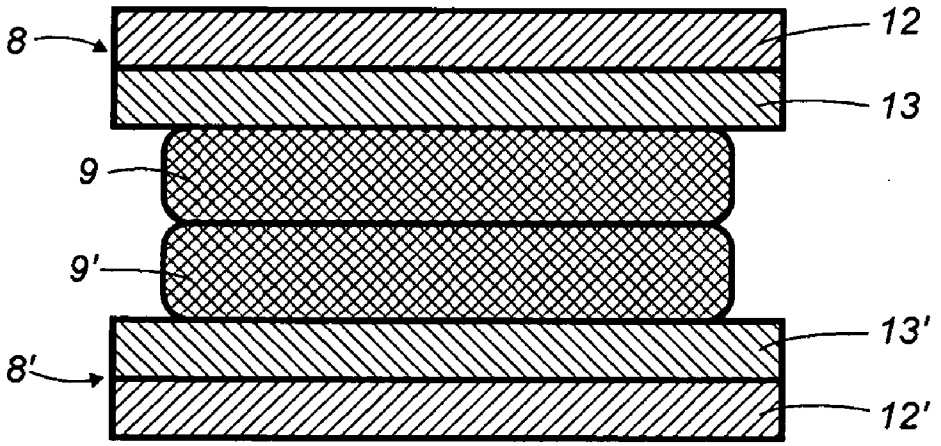


Fig. 3

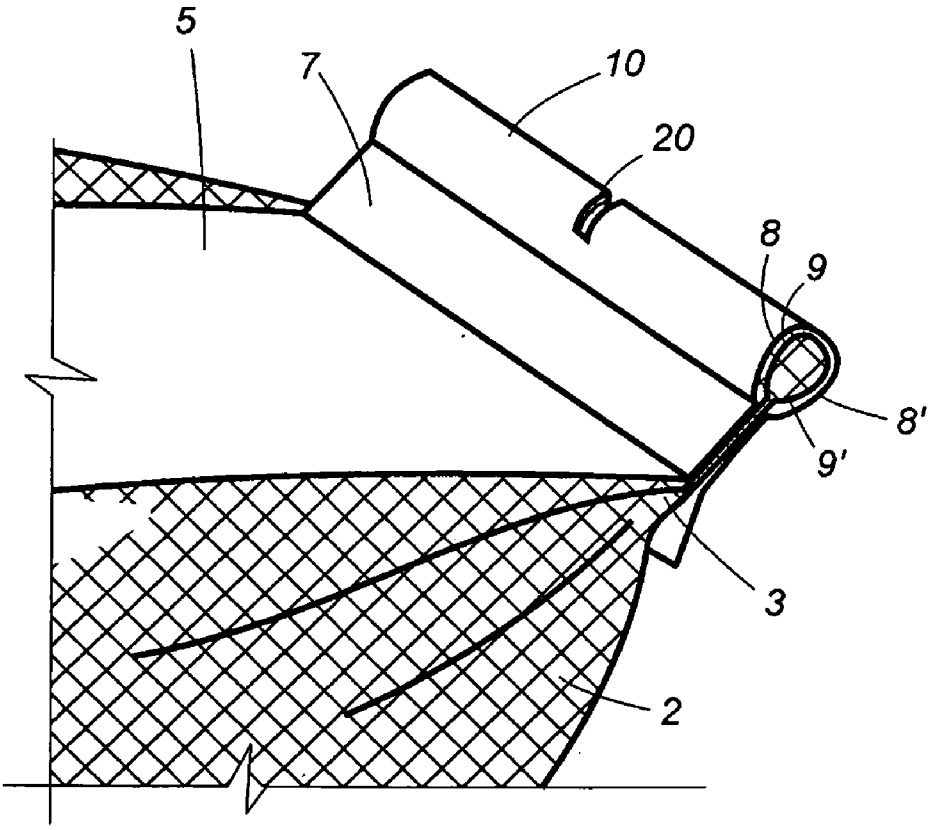


Fig. 4

ENHANCED PLASTIC NET BAG

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of priority from Spanish patent application number P200800049, filed Jan. 10, 2008, and Spanish patent application number P200802342, filed Aug. 5, 2008.

BACKGROUND

[0002] 1. Field of the Invention

[0003] As indicated by the heading, this invention refers to an enhanced plastic net bag. More specifically, the object of the invention is a bag, of the type composed of a tubular element made of plastic material in the form of a netted element, such as woven, extruded or similar mesh, with lateral sheets also made of plastic and united to it by heat sealing, which is intended primarily for the commercialization of different food products, especially fruit and vegetables, because, unlike other conventional plastic bags, it permits product transpiration and visual, tactile and olfactory inspection. It presents the particularity of including a single plastic sheet arranged along the tubular element and attached to it at the ends by areas of heat welding, with this sheet conforming the closure of the tubular element, such that the bag is composed solely of plastic elements, which in turn is more economical as less amount of material is used to manufacture it.

[0004] 2. Background of the Invention

[0005] At present, bags composed of a tubular body of netted material, accompanied by one or two sheets that provide the means to close this tubular body at its ends, are widely used.

[0006] In this respect, there are different industrial property registers, of both the applicant proper and other owners, in which different types of bags are described as per the above indicated criteria.

[0007] The characteristic common to all these bags is that the packaged product is contained in a tubular body formed by a netted element, e.g., a woven, extruded or any other kind of mesh suitable for this application. To form the bag, this tubular body is accompanied by one or two sheets, which are more or less wide, or else by a label, the mission of which is to close the ends or openings of the tubular element, as well as to provide a support for the printed information, whether it be promotional, nutritional, on traceability or of any other sort, to be used to distinguish and identify the contents of the bag.

[0008] The unions between the two components—the tubular mesh element and the sheet or sheets—are usually made by heat welding, as this procedure has proven to be the most efficient for sealing the openings or open ends of the bags and attaching the printed sheets or labels to the tubular body of the bags.

[0009] However, in order for the sealing points at the ends of the bags to be sufficiently resistant to make normal use of the bags, since in general their contents are usually of a significant weight, two sheets must be included, one on each side of the tubular element, and these sheets should be sufficiently wide.

[0010] This means that the packing machines are presented with the complexity of having to include two sheets on the bags and, on the other hand, it is not possible to appreciably reduce the amount of plastic material that forms them, since the two strips required for making them are of a width that is not possible to decrease. On the contrary, one of the defects that is usually observed at the welded ends is that they break in a longitudinal or transversal direction.

[0011] Another problem that currently occurs with these bags refers to the regularity and resistance of the welds and the satisfactory attachment of the labels. This attachment is not very satisfactory because, in some cases, the labels can come off, especially if they are used to manipulate the bags, which is often the case.

[0012] The application of metal staples is also known, and widely used, to close tubular netted materials of the woven or extruded tubular mesh type at their ends, in order to conform a container body of a certain length and diameter and, eventually, to attach a label, ribbon or tape type support for the printed information.

[0013] However, the use of such different materials for making a package, which furthermore are integrally joined together, entails a significant limitation when the possibility of selective collection is considered for subsequent recycling or energy recovery of the package. Therefore, it is obvious that, in order to eliminate the use of metal staples to close the packages in question, there is no other alternative than the one described above of uniting the mesh to one or more strips by means of welding.

[0014] Another element incorporated into many of these known bags is a handle to help hold and carry them. These handles are formed by a tape of a plastic compound that, additionally, is united by heat welding to the other components at one of the ends or openings of the bags. The incorporation of these handles means that the packing machines must be provided with the necessary means to obtain and incorporate them into the bags, with the complexity that this entails; they also represent a further increase in the amount of plastic material used to make the bags, with the resulting increase in their production and recycling costs.

[0015] In view of these drawbacks, it is obvious that it would be advantageous to have a bag that, while fulfilling the functions of the bags detailed above, does so with a minimum of material consumption, that these materials be of the same type, that they offer maximum assurances in terms of the resistance of their heat welded seals, and that, furthermore, they require a minimum of complexity of the packing machine that shapes, fills and closes the bags. These are the essential objectives of the bag proposed by this invention and regarding which, on the other hand, it should be noted that there is no knowledge of the existence of any other bag that presents similar technical, structural and configuration characteristics.

SUMMARY OF THE INVENTION

[0016] The enhanced plastic net bag proposed herein satisfactorily achieves the objectives indicated as advantageous, and it is a noteworthy novelty in its field of application because, in accordance with its creation, a bag that effectively resolves each and every one of the drawbacks described above that affect the bags of this type currently available on the market is precisely achieved. The characteristic details that make this possible are adequately indicated in the final claims that accompany this descriptive report.

[0017] Specifically, to this end, the bag according to the invention comprises a tubular body of woven, extruded or similar mesh and a single laminar strip provided on one of its sides, where both elements are made of a suitable plastic material that allows for heat welding, with the particularity

that the respective ends of this tubular body and those of the sheet conform a joint fold such that the sum of the materials included in this fold are the ones involved in the heat welded closure of the openings of the bag.

[0018] In a preferential embodiment of the invention, the laminar strip is located on the exterior of this fold that encompasses both elements—the strip and the mesh—and the mesh is located on its interior and fully gathered within the width of the strip. However, this does not entail a limitation, since these relative positions of the strip and the mesh can be altered depending on the specific preferences or needs of some cases.

[0019] On the other hand, the length of the heat welds can likewise be variable but, as a general rule, they will encompass the full width of the laminar strip and the openings of the bag; in the same way, their width can also be variable depending on the needs of each case, provided that it is sufficient so that the whole of the welded mass has a resistance suited to the dimensions and weight of the product packed in the bags.

[0020] In short, the bag of the invention is composed of a single laminar strip and a single tubular mesh body, with the lines of heat welding located at the ends folded over themselves, such that two layers of sheet and two layers of mesh are created. The result is that, with a single sheet and a single mesh tube, sealing welds of the bags are obtained with a resistance equal to or greater than that which would be achieved with two plastic material sheets and one mesh tube.

[0021] Since the mesh tube and the sheet are folded only at the ends of the bag, the weight of the bag's component material is less than what it would be if it had two laminar strips all along its length. Since the mesh tube is also folded in the area of the welds, a high resistance of these welds is obtained, even when using narrower sheets than other known bags of this type.

[0022] It should also be noted that the described configuration of the bag of the invention, in which the single laminar element is arranged along it and united only to its ends, facilitates its advantageous use as a handle to hold and carry the bag, since the welds of this laminar element with the tubular mesh body of the bag are, as described above, sufficiently resistant to withstand the weight of the product contained in the bags for their intended use.

[0023] Finally, in order to provide the bag with an opening system that allows the user to easily open it without having to resort to the use of cutting tools and, furthermore, that enables the opened bag to continue to be a valid container for the rest of the product contained in it, a small cut has been made in at least one of the folds that close the openings of the bag, beginning at the end of the fold or book folded point of the mesh and the sheet, which affects the two layers of the sheet and the two layers of the mesh.

[0024] It should be mentioned that, preferentially, these cuts are provided in the center of the folds that close the openings of the bag and are oriented perpendicularly to the folded axis of them, without this entailing a limitation since they can be shifted with respect to this center and have different orientations, e.g. oblique, without affecting their functionality.

[0025] The new enhanced plastic net bag therefore represents an innovative structure of structural and constitutional characteristics previously unknown for this purpose; these reasons, together with its practical utility, provide sufficient grounds to obtain the requested privilege of exclusivity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] For a better interpretation of the invention, this descriptive report is accompanied by some drawings that illustrate, by way of a non-limitative example, one form of execution of the invention according to the principles of the claims. In these drawings:

[0027] FIG. **1** shows a schematic view in perspective of an example of execution of the enhanced plastic net bag which is the object of the invention, where the main parts and elements that compose it can be seen, as well as the configuration and arrangement thereof.

[0028] FIG. **2** shows a detailed side elevation view of one of the ends of the bag, where the fold of the tubular element together with the laminar strip and the heat weld that keeps them united can be seen.

[0029] FIG. **3** shows a cross-section view, as per cross-section A-A indicated in FIG. **2**, where the arrangement and configuration of the mesh and laminar strip layers can be seen.

[0030] FIG. **4** shows an amplified view of the detail of one of the bag's folds, where the configuration and arrangement of the easy opening cut provided on the bag can be seen.

DETAILED DESCRIPTION OF THE INVENTION

[0031] In view of the above mentioned figures and in accordance with the numbering used, these show an example of execution of the enhanced plastic net bag that is the object of this invention, which comprises the parts and elements that are described in detail hereinafter.

[0032] Thus, with these figures in view, it can be seen how the bag (**1**) that is the object of this invention is composed of a tubular body (**2**) of woven mesh, made of a plastic material, and a laminar strip or sheet (**5**) also made of plastic material, with the particularity that the openings or closures (**3** and **4**) of the ends of the bag (**1**) are formed by an enveloping association between the tubular body (**2**) of mesh and the ends of a laminar strip (**5**), such that both the strip (**5**) and the mesh conform a fold over themselves, where the sum of the materials included in this fold are the ones involved in the heat welded closure of the openings (**3** and **4**) of the bag.

[0033] These heat welds (**6** and **7**) are preferentially arranged transversally to the longitudinal axis of the bag (**1**), forming either a continuous line or else one of discontinuous sections that extend along the width of the strip (**5**) and are composed of the fused mass provided by the two layers of the sheet (**8** and **8'**) and the two layers of the tubular mesh (**9** and **9'**), as seen in FIG. **3**.

[0034] In the example shown, the laminar strip (**5**) is located on the exterior of the fold that encompasses the strip and the mesh, and the tubular mesh element is located on the interior of this fold and is fully gathered within the width of the laminar strip (**5**), although these relative positions of the strip and the mesh can be altered as necessary.

[0035] The length (L**1**) of these lines or areas of welding (**6** and **7**) can be variable but, as a general rule, they will encompass the full width of the laminar strip and the openings of the bag; these width values range from 30 mm. to 200 mm., and preferentially from 40 to 70 mm.

[0036] In the same way, the width (L**2**) of the welds (**6** and **7**) can be variable, but it should be sufficient so that the whole of the welded mass has a resistance suited to the dimensions and weight of the product packed in the bags. The value of this width will range from 5 mm. to 30 mm., and more preferentially from 10 mm. to 15 mm.

[0037] The beginning of the lines of heat welding (**6** and **7**), at the points more towards the ends of the bag, is located at a distance (L**3**) of between 5 mm. and 50 mm., and more

preferentially between 10 mm. and 20 mm., from the book folded point (**10** and **11**) of the sheet and the mesh. This same distance (L**3**) is the one that the fold of both components has without having any type of union between them.

[0038] At the end of the heat welded lines, at the points more towards the center of the bag, a section (L**4**) is seen in which the strip (**5**) and the mesh coming out of the welded fold are free and without any union between them. This section (L**4**) may vary from being non-existent up to a maximum length of 50 mm. In a preferential execution, this section (L**4**) has a length ranging from 10 mm. to 20 mm.

[0039] The configurations of the folds closing the openings (**3** and **4**), with their respective lines of heat welding (**6** and **7**) located at both ends of the bag, are equal in a preferential execution, thus conforming symmetrical bags with respect to their central transversal axis. It is also possible to consider the variants in which the two folds closing the openings (**3** and **4**), with their respective lines of heat welding (**6** and **7**) located at both ends or openings of the bags, are not equal and may differ in terms of their dimensions (L**1** to L**4**).

[0040] The configuration of the bag (**1**), in which the single laminar element (**5**) is arranged along it and united only at its ends, facilitates the use of this laminar element or strip (**5**) as a handle to hold and carry the bags, since the welds (**6** and **7**) of this laminar element with the tubular mesh body of the bag are, as described above, sufficiently resistant.

[0041] It should be noted that the component material of the tubular mesh body (**2**) that forms the body is a thermoplastic that enables welding by fusion to the laminar strip (**5**), preferentially of the group of polyolefins (polyethylene, polypropylene, ethylenevinylacetate, etc.), and more preferentially medium density polyethylene (MDPE).

[0042] On the other hand, the component material of the laminar strip (**5**) that is welded to the ends or openings of the bag is also a thermoplastic, which enables welding by fusion to the tubular mesh body (**2**); it is preferentially of the group of polyolefins (polyethylene, polypropylene, ethylenevinylacetate, etc.), and more preferentially it is a laminar complex with an exterior layer (**12** and **12'**), more removed from the fused mass that forms the weld, of polypropylene (PP), and an interior layer (**13** and **13'**) that conforms the fused mass of the weld together with the mesh material, of low density polyethylene (LDPE).

[0043] Finally, as seen in FIG. **4**, and in order to provide the bag (**1**) with an easy opening system that, furthermore, enables the opened bag to continue to be a valid container for the rest of the product contained in it, at least one cut (**20**) has been made in at least one of the folds that close the openings of the bag, beginning at the end of the fold or book folded point (**10** and **11**) of the mesh and the sheet, which affects the two layers (**8** and **8'**) of the sheet and the two layers (**9** and **9'**) of the mesh.

[0044] These cuts (**20**) are preferentially provided in the center of the folds that close the openings (**3** and **4**) of the bag and are oriented perpendicularly to the folded axis of them, without this entailing a limitation since they can be shifted with respect to this center and have different orientations, e.g. oblique, without affecting their functionality.

What is claimed is:

1. An enhanced plastic net bag configured to be used for the commercialization of food products, the bag having a longitudinal axis and at least one end, the bag comprising:

a tubular mesh body fabricated at least partially of plastic material; and

at least one laminar strip having at least one end, wherein a closure is formed by an enveloping association between the at least one end of the tubular mesh body and the at least one end of the laminar strip by laying the laminar strip over the tubular mesh body, folding both the laminar strip and the tubular mesh body, and heat sealing the laminar strip to the tubular mesh body to form at least one heat weld wherein the at least one heat weld is transverse to the longitudinal axis, the at least one heat weld comprises a fused mass comprising at least two layers of the laminar strip and at least two layers of the tubular mesh body.

2. An enhanced plastic net bag according to claim **1**, wherein the plastic material of the tubular mesh body is a netted element including at least one of a woven mesh, an extruded mesh, and a similar mesh.

3. An enhanced plastic net bag according to claim **1**, wherein the at least one laminar strip is fabricated from a plastic material.

4. An enhanced plastic net bag according to claim **1** wherein the laminar strip has a strip width, and further wherein the heat weld is at least one of a continuous line that extends along the strip width and a discontinuous line including sections that extend along the strip width.

5. An enhanced plastic net bag according to claim **1**, wherein the closure has an exterior and an interior, the laminar strip is positioned on the exterior of the closure and the tubular mesh element is positioned on the interior of the closure.

6. An enhanced plastic net bag according to claim **1**, wherein the laminar strip has a strip width, and the heat weld has a weld length, wherein the weld length comprises the strip width.

7. An enhanced plastic net bag according to claim **6**, wherein the weld length is between about 30 mm. and about 200 mm.

8. An enhanced plastic net bag according to claim **6**, wherein the weld length is between about 40 mm. and about 70 mm.

9. An enhanced plastic net bag according to claim **6**, wherein the heat weld has a width between about 5 mm. and about 30 mm.

10. An enhanced plastic net bag according to claim **6**, wherein the heat weld has a width between about 10 mm. and about 15 mm.

11. An enhanced plastic net bag according to claim **1**, wherein the food products comprise at least one of fruit and vegetables, and wherein the heat weld has a strength configured to withstand the weight of the food products in the bag.

12. An enhanced plastic net bag according to claim **1**, wherein the closure has a first end and a second end and at least one opening extending between the first end and the second end, the closure also has a length, the length is between 5 mm. and 50 mm.

13. An enhanced plastic net bag according to claim **1**, further comprising a section that extends beyond the closure, the section comprising a portion of the laminar sheet and a portion of the mesh tubular body, the portion of the laminar sheet and the portion of the mesh tubular body each have an uncoupled end, the section has a length that is between about 10 mm. and about 20 mm.

14. An enhanced plastic net bag according to claim **1**, wherein the bag is symmetrical with respect to the longitudi-

nal axis and the bag is symmetrical with respect an axis that is transfer to the longitudinal axis.

15. An enhanced plastic net bag according to claim **1**, wherein the at least one laminar strip is configured to form a handle to hold and carry the bag.

16. An enhanced plastic net bag according to claim **1**, wherein the tubular mesh body and the laminar strip are thermoplastic to facilitate fusion welding the laminar strip, the thermoplastic is at least one of a polyolefin, the polyolefin is at least one of a polyethylene, polypropylene, and ethylenevinylacetate.

17. An enhanced plastic net bag according to claim **1**, wherein the tubular mesh body and the laminar strip are thermoplastic to facilitate fusion welding the laminar strip, the thermoplastic is medium density polyethylene.

18. An enhanced plastic net bag according to claim **1**, wherein the laminar strip has an exterior layer that is a laminar complex of polypropylene, and the laminar strip has an interior layer that is low density polyethylene.

19. An enhanced plastic net bag according to claim **1**, wherein the heat weld may further comprise at least one cut therein and extending between the at least two layers of the laminar strip and the at least two layers of the tubular mesh body.

20. An enhanced plastic net bag according to claim **19**, wherein the heat weld has a first end and a second end, wherein the at least one cut is defined between the first end and the second end of the heat weld, and further wherein the at least one cut is substantially perpendicular to heat weld.

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