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(54) Device and method for sealing packages of rolled-up fabrics.

(57) A sealing device for rolled-up-fabric packages, in particular plastics packages, comprises a first substantially rigid clamping element (4) made of plastic material and adapted to partly encircle a sealing area of said one package, and a second clamping element (7) made of plastic material and adapted to be engaged with said first clamping element (4) according to a plurality of positions, so as to completely enclose said sealing area, said first and second clamping elements (4, 7) defining pre-shaped clamping surfaces (9a, 9b) between which said sealing area is squashed, and said first and second clamping elements (4, 7) comprising means for mutual engagement by forced fitting (7a, 8) adapted to define an irremovable engagement.

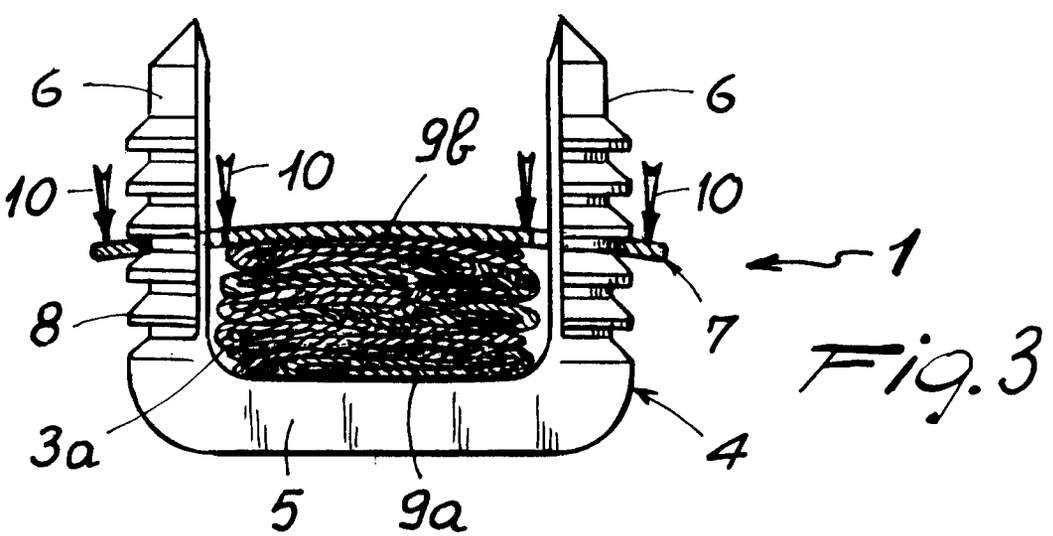

Fig. 3

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The invention relates to a device and method for sealing packages of rolled-up fabrics, in particular plastics packages.

It is known that packing sheets, generally made of plastic material, polyethylene for example, are currently wrapped around fabric rolls.

These packing sheets are clamped and locked to the rolled-up position in many cases with the aid of clips or staples of metal material.

Said clips are bent upon themselves in the same manner as common staples for holding paper sheets together.

The staples are applied to the end portions of the packing sheets which are disposed close to the ends of the rolls and folded in a layered or pleated form.

This known technique has the merit of being simple and cheap and also of holding said end portions of the packing sheets steadily, so that they practically form end bunches in the rolls, which bunches are also very useful for grasping the fabric rolls when they are arranged in a stack.

In fact, when several rolls are arranged in a stack, withdrawal of a single roll when it is not located uppermost is possible only by making the same slide in a direction parallel to its wrapping axis, and in this case the grasping point enabling said withdrawal is exactly said end bunch.

Beside the above advantages, this known technique also has some drawbacks.

In fact, due to the rules of law obliging to carry out a differentiated disposal of refuse, metal staples need to be separated from the packing sheets of plastic materiale before sending the latter to the dump.

Therefore a specific intervention on the staples is necessary in order to separate them from the plastics sheets. This operation is time-consuming and therefore increases costs.

The increase in costs may have an important incidence if we consider that, when a great number of rolls is to be handled, which usually happens in some industries in the textile field, it is sometimes necessary to assign appropriate staff to this operation of separating the different parts of the packaging before getting rid of them.

Another drawback is connected with the fact that the above metal staples do not enable achievement of a hermetic seal of the packages.

In fact the application of said staples involves the steps of bending them and turning their ends towards the central portion of same and therefore, once said staples have been bent, their profile is like that of a butterfly, that is the staple ends are expanded due to the presence of curved loops formed by said bending.

Practically the known metal staples in use produce on the layers they tighten a greater squashing at the central area than at the ends where said curved loops are present. Due to said unevenness in squashing, a perfect sealing cannot be ensured.

It is also to be noted that known metal staples not only are incapable of ensuring a perfectly sealed closure, but in some cases they may even become slack and slipping off the package, thereby practically causing a complete opening of same.

Another drawback is connected with the variable thickness of the layered or pleated portions, to which said staples are applied. In fact it may be necessary to provide for the use of a wide variety of staples belonging to different size classes depending on the packages to be sealed by them.

In order to obviate some of the above drawbacks, it is possible to carry out closure of rolled-up-fabric packages by adopting sealing techniques for the sheets that do not use additional elements such as said staples.

For example the end portions of said packages may be heat sealed, but this process is restricted to fabric rolls which are not very heavy since in this case breakages in the packaging material are likely to occur.

Said packing sheets may also be sealed by ultrasonic welding, but this technique involves high costs for installation and in addition is of difficult adjustment.

The package ends may also be closed by adopting the technique of heat shrinkage by hot air. This known technique however is not widely applied because in some cases the material to be packed can be damaged.

In addition, heat-sealing, ultrasonic welding and heat-shrinkage reduce the sizes of said end bunches and therefore manual handling of rolls is made more difficult.

Under this situation, the technical task underlying the present invention is to devise a sealing device and a method capable of substantially eliminating the above drawbacks.

The technical task specified is substantially achieved by a device and method for sealing rolled-up-fabric packages, in particular plastics packages, as claimed in Claims 1 and 5.

The features and advantages of the invention will be hereinafter described with reference to a preferred embodiment of same, with the aid of the accompanying drawings, in which:

Figure 1 is an exploded view of the component parts of the device of the invention, one of said parts being shown in face elevation and the other in top view and overturned;

Figure 2 is a top view, partly in section, of the component parts shown in Fig. 1, in an assembled condition;

Figure 3 is an elevational front view partly in section of the device of Fig. 1 in an operating

position; and

Figures 4 and 5 show two operating steps in succession for applying the device of Fig. 1 to a rolled-up-fabric package.

Referring to the drawings, the device of the invention has been identified by reference numeral 1.

It applies to a package 2 consisting of a wrapping sheet of plastic material such as polyethylene for example, gathered at its ends so as to form end portions 3 folded in a pleated configuration.

The device 1 comprises a first clamping element consisting of a clip in the form of a staple 4, that is having a substantially U-shaped configuration comprising a central portion 5 and two side arms 6 parallel to each other.

Staple 4 is arranged around a sealing area 3a disposed at an end portion 3 of said package.

Also provided is a second clamping element consisting of a plate 7 provided with gauged holes 7a to be coupled by force with the side arms 6 of staple 4, so as to define therewith a body fixedly embracing the sealing area 3a. Actually, said first and second clamping elements comprise means for mutual engagement by forced fitting adapted to define an irremovable clamping.

As discernible from the drawings, staple 4 is provided on its side arms with locking portions 8 consisting of a series of extensions insertable in the gauged holes 7a, said gauged holes being such sized, relative to the locking portions 8, that the plate 7 once fitted can be removed therefrom only if it is broken or greatly torn.

In detail, the locking portions 8 are formed on external regions of the side arms 6 turned outwardly from staple 4, so that the locking portions 8 of a side arm 6 do not face the locking portions of the other side arm 6.

In this manner, fitting movements of the plate 7 on the staple 4 are prevented when a localized pressure is exerted on the plate itself at a middle region thereof, that is the region between the two gauged holes 7a, as better clarified in the following.

In addition, the locking portions 8 turned outwardly of staple 4 enable the formation of a wide and smooth seat 4a, at the inside of said staple, into which the package to be clamped can be introduced easily and without any risks of tearing.

Each of the locking portions 8 is saw-toothed and exhibits an inclined face 8a with respect to the central portion 5, and a transverse face 8b substantially parallel to said central portion 5.

The inclined faces 8a promote a forced insertion of the plate 7, if conveniently pushed at the gauged holes 7a, whereas the transverse faces 8b fixedly hook the plate 7, once it has been conveniently fitted.

The first and second locking elements 4 and 7 define opposite clamping surfaces, 9a and 9b respectively, between which the sealing area 3a is squashed, within the seat 4a.

One feature of the invention is that the first and second clamping elements 4 and 7 are made of rigid or semirigid plastic material. Therefore the clamping surfaces 9a, 9b are pre-shaped on the elements themselves.

Advantageously, the selected plastic material is the same material as used for the manufacture of package 2: for example, if the packing sheets are made of polyethylene, the first and second clamping elements 4 and 7 will be of polyethylene as well.

Use of the device is as follows.

Staple 4 is positioned on the sealing area 3a of a package 2 so that it embraces said area between the side arms thereof 6, within the smooth seat 4a.

At this point plate 7 can be arranged so that its gauged holes 7a are disposed on the side arms 6 and pushed towards the central portion 5.

The thurst action must be exerted at the ends of plate 7 or at the gauged holes 7a so that a forced fitting of the plate itself may be allowed, due to the presence of the inclined faces 8a.

A thrust exerted on the middle portion of plate 7 practically does not enable a forced fitting, in that the inclined faces 8a are located externally of staple 4.

In this manner the package is best clamped at the most critical areas and a better seal is achieved.

The plate 7 is moved close to the central portion 5 until it completely compacts the package pleats between the clamping surfaces 9a, 9b.

The locking portions 8 stop the plate 7 to the final position reached and prevent slipping off of same.

The clamping surfaces 9a and 9b clamp the sealing area 3a by muving close to each other and therefore the staple 4 can be conceived of large sizes as regards the length of both the central portion 5 and side arms 6.

In this manner it can be fitted on a sealing area 3a of substantially any size.

It is pointed out that the adaptability of the device to any type of rolled-up-fabric package is not to the detriment of the hermetic seal of same in that, even if the package occupies only one portion of the room included between the side arms 6, the greater pressure necessarily exerted exactly at said side arms prevents the pleats from opening or moving to the free space.

A sealing method for packing rolled up fabrics is put into practice by said device.

According to the method in question the sealing area 3a is submitted to opposite pressures

exerted by substantially parallel and opposite surfaces, corresponding to the clamping surfaces 9a, 9b.

Mutual approaching of the clamping surfaces performs a squashing action on the pleats of the sealing area 3a and causes a given orientation of said pleats which will tend to be arranged in tight contact with each other taking substantially parallel positions.

Pleats are only subjected to compression and any twisting stress is reduced.

In addition, according to one aspect of the method shown in Fig. 3, the clamping efforts 10 are exerted close to the end edges of the sealing area 3a.

Thus a slight outwardly-convex bending of the clamping surfaces may be caused and at all events a squashing pressure which is higher exactly at the end regions of said pleats, where they form folding loops and where an appropriate seal is more likely to be lacking if the pleats occupy only part of the room included between the clamping surfaces.

Practically the greatest clamping action is exerted exactly at the most critical areas for the achievement of a hermetic seal.

The invention achieves important advantages.

The use of component parts made of the same plastic material as the packages reduces costs for disposal because packages and clampers are homogeneous and do not need to be mutually separated.

In addition, the device is adapted for packages which are very different from one another as regards size and thickness, because closure takes place between two opposite surfaces that can be conceived of large sizes and variably spaced apart from each other.

The sealing action does not cause twistings of the package, but a mere compression of same, thereby avoiding risks of tearings.

In addition compression is particularly marked exactly at the edge pleats which are more critical for a hermetic sealing.

It is pointed out that the device and method are very simple and involve low costs.

Claims

1. A sealing device for packages of rolled-up fabrics, in particular for packages of plastic material, characterized in that it comprises:
   - a substantially rigid clamping element (4), made of plastic material and adapted to partly encircle a sealing area of said one package;
   - and a second clamping element (7) of plastic material to be engaged with said first clamping element (4) according to a plurality of positions, so as to completely enclose said sealing area,
   - said first and second clamping elements (4, 7) defining pre-shaped and opposite clamping surfaces (9a, 9b) between which said sealing area is squashed, and
   - said first and second clamping elements (4, 7) comprising means for mutual engagement by forced fitting (7a, 8) adapted to define an irremovable engagement.

2. A device according to Claim 1, wherein said first and second clamping elements (4, 7) are made of the same plastic material as that of said packages.

3. A device according to Claim 1, wherein said first clamping element (4) exhibits, at the inside thereof, a substantially smooth seat (4a) for said package and wherein said means for mutual engagement by forced fitting (7a, 8) is disposed externally of said seat (4).

4. A device according to Claim 1, wherein said second clamping element (7) is a plate to be forcedly coupled with said first clamping element (4).

5. A device according to Claim 4, wherein said first clamping element (4) is a substantially U-shaped element or staple the side arms (6) of which are provided with locking portions (8) of a saw-tooth configuration, and wherein said plate (7) exhibits a pair of gauged holes (7a) conveniently sized relative to said locking portions (8) so as to form therewith an irremovable clamping when said plate (7) is engaged with said clamping element (4).

6. A device according to Claim 5, wherein said locking portions (8) of a saw-tooth configuration are disposed on regions of said side arms (6) turned outwardly of said first clamping element (4).

7. A sealing method for packages of rolled-up fabrics, in particular for plastics packages, characterized in that it consists in submitting a sealing area of said package to a clamping action generated by moving opposite clamping surfaces close to each other so as to form, in said package, pleats folded over according to substantially parallel lying planes, and wherein said opposite clamping surfaces are moved close to each other by clamping stresses applied close to the edges of said sealing area.

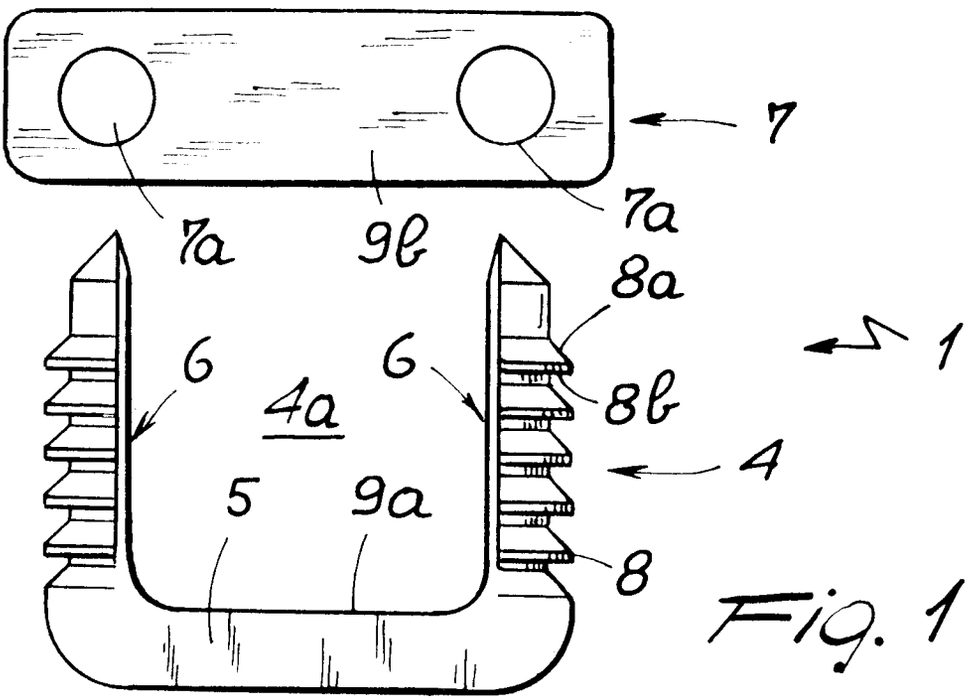

Fig. 1

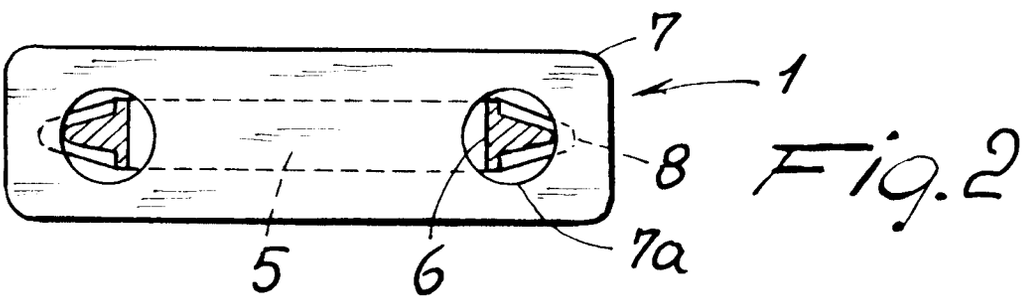

Fig. 2

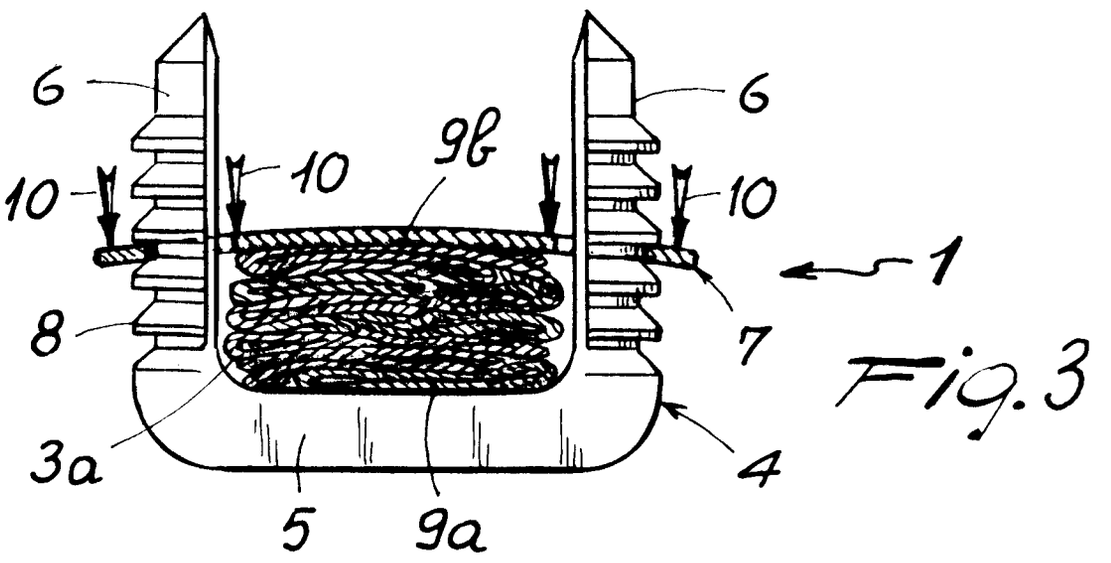

Fig. 3

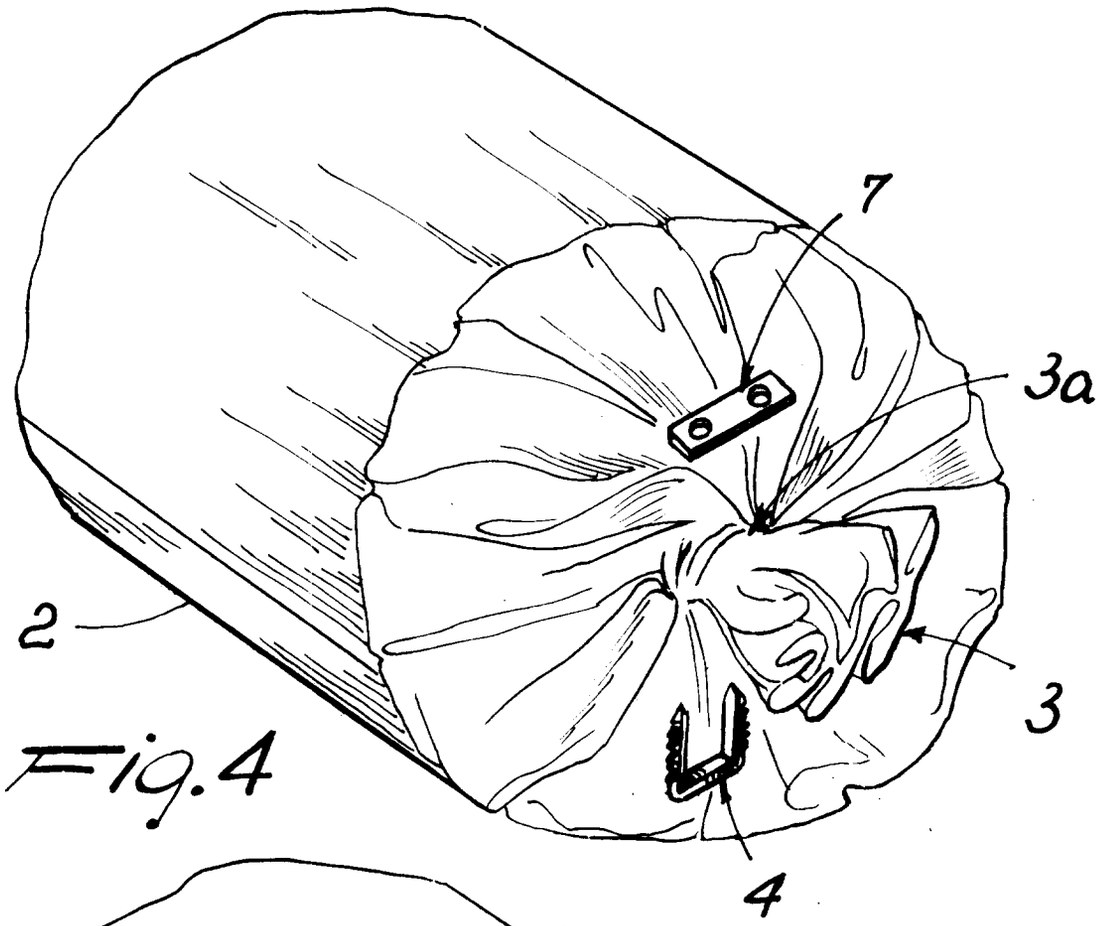

Fig. 4

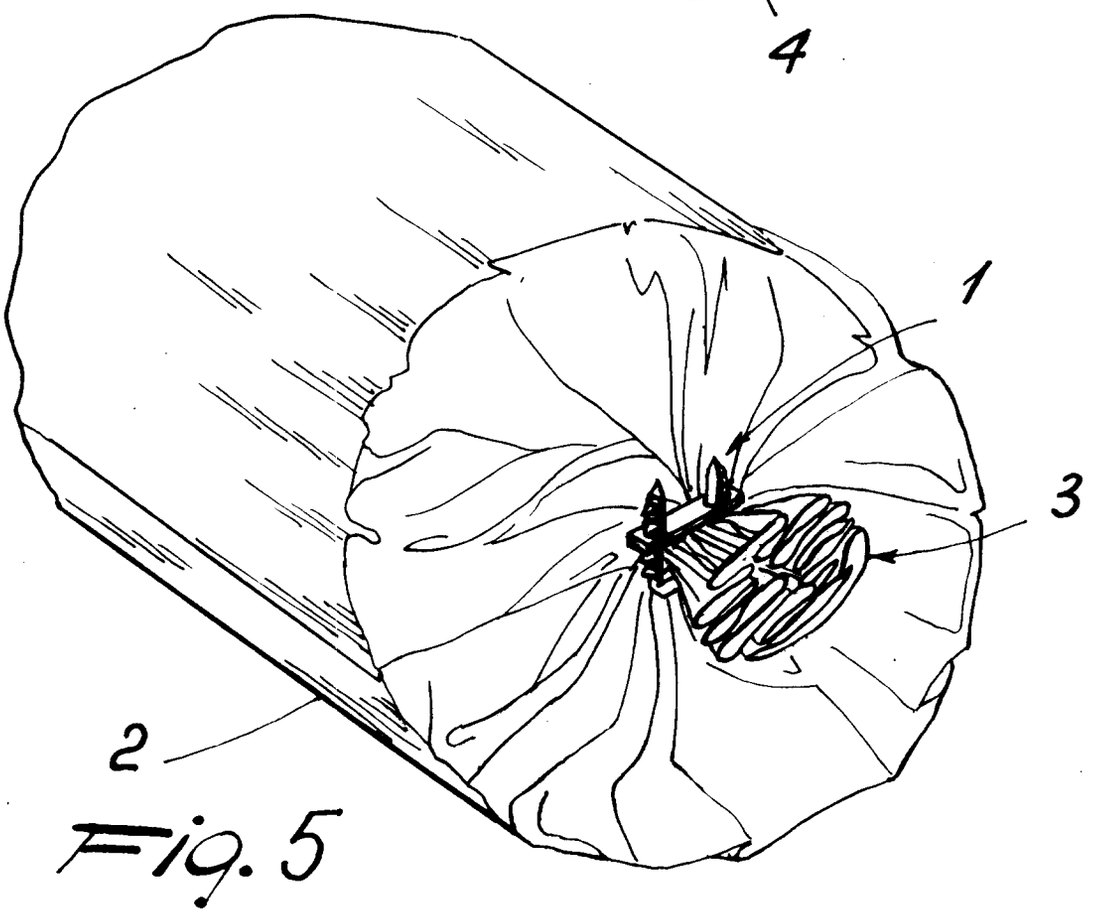

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 94 11 8419

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X A	WO-A-87 07240 (EMCTAMACO) * the whole document * ---	1,3-6 2,7	B65D33/16
X A	EP-A-0 002 844 (MADSEN) * the whole document * ---	7 1,2,5,6	
A	EP-A-0 444 291 (WINDMÖLLER & HÖLSCHER) * abstract * ---	2	
A	DE-U-92 12 470 (DOSTRO-KUNSTSTOFFWERKE) * page 1, paragraph 4 * -----	2	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 March 1995	Leong, C

CATEGORY OF CITED DOCUMENTS

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