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Patentanwältin

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(54) **Packaging set with buffer means**

(57) The invention concerns a packaging set with a shipping box (1) and with protective elements (2,20) for protecting damageable products, such as TV sets. The protective elements (2,20) are arranged at at least corners of the shipping box (1). According to the invention

the protective elements (2) are fixed outside of the shipping box (1). The protecting elements comprise numerous studs (10,21,22,30), which are elastically deformable or plastically deformable or both elastically and plastically deformable.

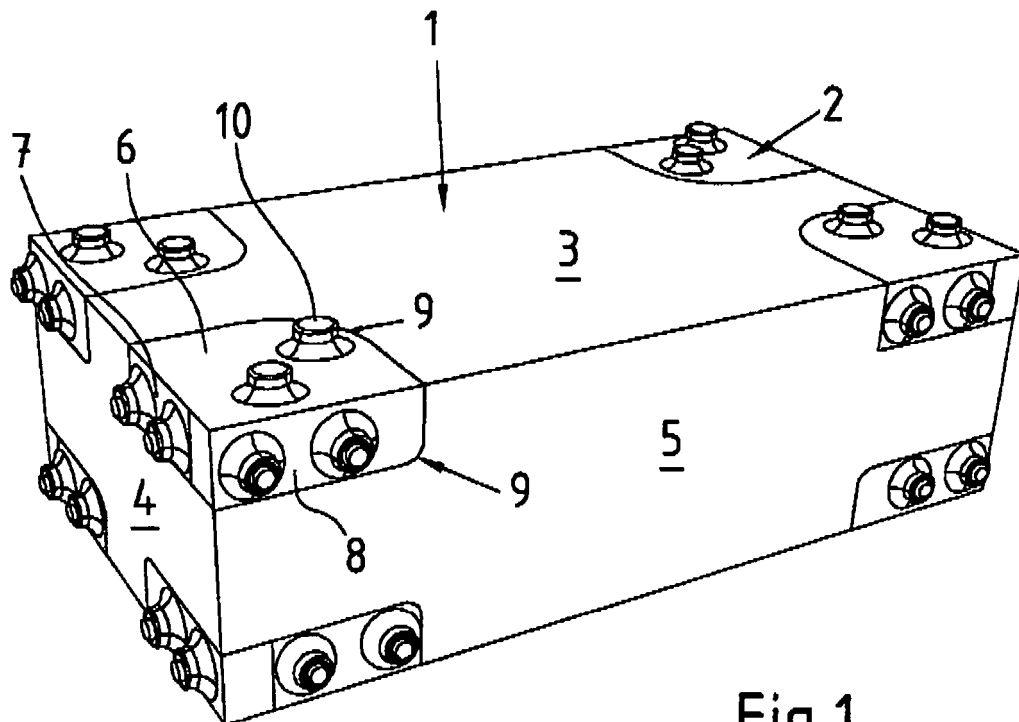


Fig.1

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Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] The present invention is related to a packaging set according to the preamble of claim 1, which comprises a shipping box, such as a carton or a cardboard box, and protective elements for protecting damageable products. The invention is used for damageable consumer products, such as TV sets, personal computers or home equipments, which are manufactured industrially and which are shipped all around the world.

DESCRIPTION OF THE PRIOR ART

[0002] Damageable products must be protected by its packaging against damage due to e.g. drops.

[0003] Packaging sets with protective elements generated as big buffers and made of expanded material, e.g. EPS inside of shipping boxes, are well known. The packaging sets, in particular the buffers, are individually developed for each of the damageable products.

[0004] The protective elements are made out of a material, which is a product of mineral oil and which is hazardous for the environment. As a result, the protective elements require a lot of effort to be recycled. In some regions the elements cannot be recycled and may be transported to another region. The material of the protective elements, namely the mineral oil, will be more and more expensive in the future.

[0005] A special protective element, mentioned as packaging preform, is described in the WO 93/16937. The preform is used for making a corner protector intended to be placed around a corner on an article in order to protect said corner against impact during handling and transport. In particular, the corner protector is placed between the corner of the article and an internal corner in a box or similar packaging container. The packaging preform consists of fibre pulp material. The corner protector is able to absorb a substantial amount of impact energy, both by elastic deformation and especially plastic deformation of the raised portions or projections.

[0006] A disadvantage of both types of the above mentioned protective elements is that they very voluminous and require a large amount of space in order to be efficient for absorbing shock and for protecting the product. They cause high logistic costs e.g. by filling up of containers or trucks.

[0007] The US-Patent US 4,838,427 describes protective elements, mentioned as shipping protectors, which are adapted for interposition between a shipping container and an object being shipped for spacing said object within that container. The shipping protector, which is generated as pulp protector, is provided with an interior layer of resilient plastic foam material, which is self adherent to the protector. The protectors are designed to

protect an object, such as an item of furniture, by absorbing shock while at the same time positioning the item of furniture within the carton. The protectors fixed on the corners of an object have practically no elasticity or only a marginal elasticity. If the shipping box with the protectors is dropped, electronic products inside the shipping box, such as a TV set, are not protected from damage.

[0008] Protective elements, mentioned as floating corners, for insertion into an outer packing container to protect an object in an inner container, are known by the US 4,287, 265. One of the floating corners comprises a sheet of a generally rigid first material with openings and blocks of a firm, spongy, resilient second material, which are arranged in the openings of the folded sheet. These protective elements need an additional outer shipping box and are quite voluminous.

SUMMARY OF THE INVENTION

[0009] It is therefore desirable to improve a packaging set according to the preamble of claim 1, with respect to protect damageable products without taking up a lot of room.

[0010] According to the invention this can be achieved by the features of claim 1. Possible advantageous developments of the invention are specified in the dependent claims.

[0011] A packaging set of the invention comprises a shipping box, such as a carton or a cardboard box, and protective elements. The protective elements are arranged at at least corners of the shipping box. The protective elements can additionally be arranged at edges of the shipping box.

[0012] According to the invention, the protective elements comprise numerous studs, which are generated by projections, which rise from faces of the protective elements. The projections can be shaped as cylinders, cones, stumps, cuboids, pyramids or similar elements. The studs are elastically or plastically deformable or both elastically and plastically deformable.

[0013] The wall thickness of the studs is between 0,5 to 4 mm depending on the material of the protective elements. The material of the protective elements is a polypropylene or a polyethylene or a similar material. Polyethylene needs a higher wall thickness than polypropylene. The bottom diameter of the studs corresponds to its height or is greater than the height.

[0014] The height of the projecting studs can be some millimetres to few centimetres. As a result, the packaging set of the invention requires less space due to the less voluminous protective elements.

[0015] According to the invention the protective elements are fixed outside of the shipping box. A serious drop of a shipping box with a damageable product inside will cause not only an elastically deformation but also a plastically deformation of at least one of the studs of the protective elements. Such a deformation of a stud outside of the shipping box is visible. This feature overcomes the

disadvantage of all of the above mentioned packaging sets of the art, that the product can be damaged during transport, in particular during small quantity express shipment, without showing clearly visible marks outside on the outer shipping box.

[0016] The protective elements can comprise both elastically deformable studs and plastically deformable studs.

[0017] The protective element can comprise studs, mentioned as bi-functional studs, which are simultaneously elastically and plastically deformable.

[0018] As an alternative, all of the studs can be bi-functional studs. The bi-functional studs can be shaped as a stump with a top cover. The stump generates the more elastically deformable part and the cover the more plastically deformable part of the bi-functional studs. The height of the stump is greater than the height of the top cover; e.g. the height of the stump is 2/3 of the overall height of the studs.

[0019] In addition, the protective elements can comprise corner and/or edge studs.

[0020] The protective elements can be made by plastics mouldings, in particular by injection mouldings. They can be generated as corner and edge elements.

[0021] The protective elements can be alternatively generated as moulded planar elements, which are folded to edge and corner elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The invention will be explained in more detail using two embodiments, which are illustrated in figures 1 to 6.

[0023] It shows:

- Figure 1, a simplified perspective view of a packaging set of the first embodiment of the invention;
- Figure 2, a simplified view of an unfolded protective element with studs of the packaging set;
- Figure 3, a simplified cross section of a bi-functional stud, which is simultaneously elastically and plastically deformable stud of the protective element;
- Figure 4, a simplified cross section of an alternative bi-functional stud;
- Figure 5, a simplified cross section of a protective element of the second embodiment of the inventions;
- Figure 6, a simplified perspective view of a packaging set of the second embodiment of the invention.

DETAILED DESCRIPTION OF A FIRST EMBODIMENT OF THE INVENTION

[0024] A packaging set of a first embodiment of the invention comprises a shipping box 1 and numerous protective elements 2. The shipping box 2 has the shape of

a longish cuboids with rectangular faces, in particular with top and bottom faces 3, shorter side faces 4, and longer side faces 5.

[0025] The protective elements 2 are arranged at the eight corners of the shipping box 1. Each of the protective elements 2 is fixed on an outside corner.

[0026] Each of the eight protective elements 2 constitutes a rectangular corner. It extends with three faces 6, 7, 8, which are rectangular to each other, on the three faces 3, 4, 5 of the corresponding corner of the shipping box 1. In particular, each protective element 2 comprises two longish rectangular faces 7, 8, which extend on the side faces 4, 5 of the shipping box 1, and a nearly quadratic face 6, which extends on the top or on the bottom face 3. The length of the longish faces 7, 8 corresponds to the extension of the adjacent sides of the quadratic face 6. The width of a longish face 7, 8 constitutes 0,2 to 0,5 of its length. The free corners of the quadratic face 6 and of the longish faces 7, 8 are rounded. This is shown by arrows 9 in figures 1 and 2.

[0027] The protective elements 2 comprise numerous studs, which project from the faces 6, 7, 8. All of the studs are generated as bi-functional studs 10, which are simultaneously plastically and elastically deformable.

[0028] The bi-functional studs 10 are shaped as a stump 11 with a top cover 12, which is connected to the stump 11. The top cover 12 comprises a round top face 12a and a conical face 12b. In this embodiment the top cover 12 is connected to the stump 11 by a corrugated ring connection. The ring connection comprises an inner annular cavity 13, which is connected to the top cover 12, and an outer annular concavity 14, which is connected to the stump 11. This is shown in figure 3. The top cover 12 is elastically movable with respect to the shipping box 1 due to the ring connection 13, 14 and the stump 11. As a result, the studs 10 are elastically deformable up to a certain force. A greater force than this certain force will deform the studs 10 plastically and visible.

[0029] The height of the stump 11 is e.g. 2/3 of the overall height of the studs 10, which can be chosen between 12 to 20 mm. The bottom diameter of the studs 10 corresponds to the height or is greater than the height. The radiuses of the inner and outer cavity 13, 14 can differ.

[0030] The protective elements 2 are made in one piece by plastics mouldings. The protective elements 2 are generated by moulded planar elements, which are folded to the protective elements 2 as corner elements.

[0031] A planar element, as one piece, comprises the quadratic face 6 and the two longish faces 7, 8, which are connected to two rectangular sides of the quadratic face 6. The connections are generated by grooves 15 in the planar element. The planar element comprises in addition a small face 16, which is also connected to one of the longish faces, namely the face 8, by a groove 15. The small face 16 extends from the face 8 at the side of the second longish face 7 without being connected with this

face 7. The small face 16 is arranged behind the face 7, when the planar element is folded, and serves as fixing member.

[0032] The wall thickness of the bi-functional studs 10 is between 0,7 to 1,5 mm depending on the material of the protective elements 2. The material of the protective elements 2 of this embodiment is a polypropylene and its wall thickness is e.g. 0,8 mm. This protective element 2 can be used in order to protect a damageable product of 20 kg.

[0033] As an alternative, polyethylene can be used as material of the protective elements 2. When using polyethylene a higher wall thickness is needed.

[0034] An alternative shape of a bi-functional stud 17 with a stump 18 and a top cover 19 is shown in figure 4. The top cover 19 comprises a round top face 19a and a conical face 19b and is directly connected to the stump 18 by the conical face 19b. The inclination of the conical face of the stump 18 is higher than that of the top cover 19. The height of the stump 18 is e.g. 2/3 of the overall height of the stud 17, which can be chosen between 12 to 20 mm. The bottom diameter of the stud 17 corresponds to the height or is greater than the height.

[0035] As an alternative, the three faces 6, 7, 8 of the protective elements can have the some shape, e.g. the shape of a triangle.

DETAILED DESCRIPTION OF A SECOND EMBODIMENT OF THE INVENTION

[0036] The second embodiment of the invention corresponds to the first embodiment except for the following features:

[0037] The packing set comprises protective elements 20 with some studs 21, which are elastically deformable and some studs 22, which are plastically deformable. The cross sections of the studs 21, 22 are seen in figure 5.

[0038] The plastically deformable studs 22 have the shape of a cone 23 with a rounded top 24 with a certain height, shown in figure 5 as H. The height of the top 24 is less than or similar to the height of the cone 23. The overall height of the plastically deformable studs 22 can be chosen between 12 and 15 mm.

[0039] The elastically deformable studs 21 have the shape of a stump 25 with a flat top face 26. The elastically deformable studs 21 are provided with longitudinal slots 26 extending over a great part of their height. The number of the slots can be 2, 3, 4 or more. In this embodiment 3 slots 26 are provided.

[0040] The height of the elastically deformable studs 21 is greater than the height of the plastically deformable studs 21. The difference of the heights, shown in figure 5 as h, is few millimetres. The height of the elastically deformable studs 22 can be chosen between 15 and 20 mm.

[0041] Similar to the protective elements 2 of the first embodiment the protective elements 20 of the second embodiment cover the rectangular corners of its shipping

box 1 with three faces 27, 28, 29. The studs 21, 22 are arranged on the faces 27, 28, 29. Two elastically and two plastically deformable studs 21, 22 project from the quadratic face 27, one elastically and one plastically stud 21, 22 project from the longish face 28 and one plastically deformable stud 22 projects from the other longish face 29.

[0042] An additional plastically deformable corner stud 30 is provided at the corner of each of the protective elements 20. This corner stud 30 has a greater wall thickness than the other studs 21, 22. The wall thickness of the corner stud 30 is few millimetres, in particular 2 to 3 millimetres. The three faces 27, 28, 29 have an additional common layer 31 in a region around the corner stud 30. As shown in figure 5, the height of the corner stud 30 in the direction, in which the stud 22 extends, is less or equal to the height of the cone 23 of a plastically deformable stud 22.

[0043] In a case, in that the shipping box 1 with the protective elements 20 drops onto a face 3, 4 or 5 of the shipping box 1 at least the studs 21, 22 on corresponding faces 27, 28 or 29 of the protective elements 20 are involved.

[0044] Up to a certain force and until the difference height h is reached, the elastically deformable studs 21 will be elastically compressed. A greater force than this certain force will deform the studs 22 plastically and visible. The corner studs 30 can also be involved and will deform plastically and visible. The plastically deformable studs 22, 30 absorb the force onto the shipping box 1.

[0045] In a case, in that the shipping box 1 drops onto a corner only the corner studs 30 are involved. They will absorb the dropping force and deform plastically and visible, when the force has a certain amount.

[0046] The elastically deformable studs 21 also work as stacking elements stacking several shipping boxes 1 onto each other.

[0047] The protective elements 20 are made by plastics mouldings, in particular by injection moulding, as corner elements.

Claims

1. Packaging set with a shipping box (1) and with protective elements (2, 20) for protecting damageable products, such as TV sets, which protective elements (2, 20) are arranged at at least corners of the shipping box (1) and which protective elements (2, 20) are both elastically deformable and plastically deformable

characterized in that

the protective elements are fixed outside of the shipping box (1),

the protective elements (2, 20) comprise numerous studs (10, 21, 22, 30),

and the studs (21, 22, 30, 10) are elastically deformable or plastically deformable or both elastically and

plastically deformable.

2. The packaging set according to claim 1 **characterized in that** the protective elements (20) comprise elastically deformable studs and plastically deformable studs (21, 22). 5
3. The packaging set according to claim 1 or 2 **characterized in that** the protective elements (2) comprise studs (10), mentioned as bi-functional studs (10), which are simultaneously elastically and plastically deformable. 10
4. The packaging set according to claim 3 related to claim 1 **characterized in that** the protective elements (2) only comprise bi-functional studs (10). 15
5. The packaging set according to claim 3 or 4 **characterized in that** the bi-functional studs (10) are shaped as a stump (11) with a top cover (12). 20
6. The packaging set according to one of the claims 1 to 5 **characterized in that** the protective elements (20) comprise corner studs (30) and/or edge studs. 25
7. The packaging set according to one of the claims 1 to 6 **characterized in that** the protective elements (2, 20) are made by plastic mouldings.
8. The packaging set according to claim 7 **characterized in that** the protective elements (2) are generated by moulded planar elements, which are folded to edge or to corner elements. 30

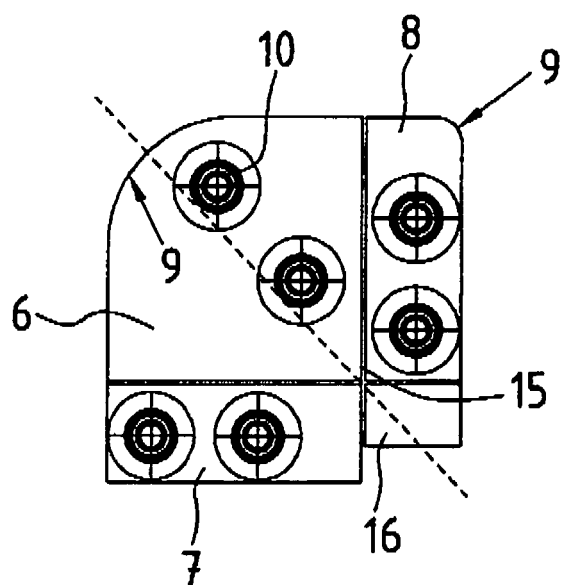
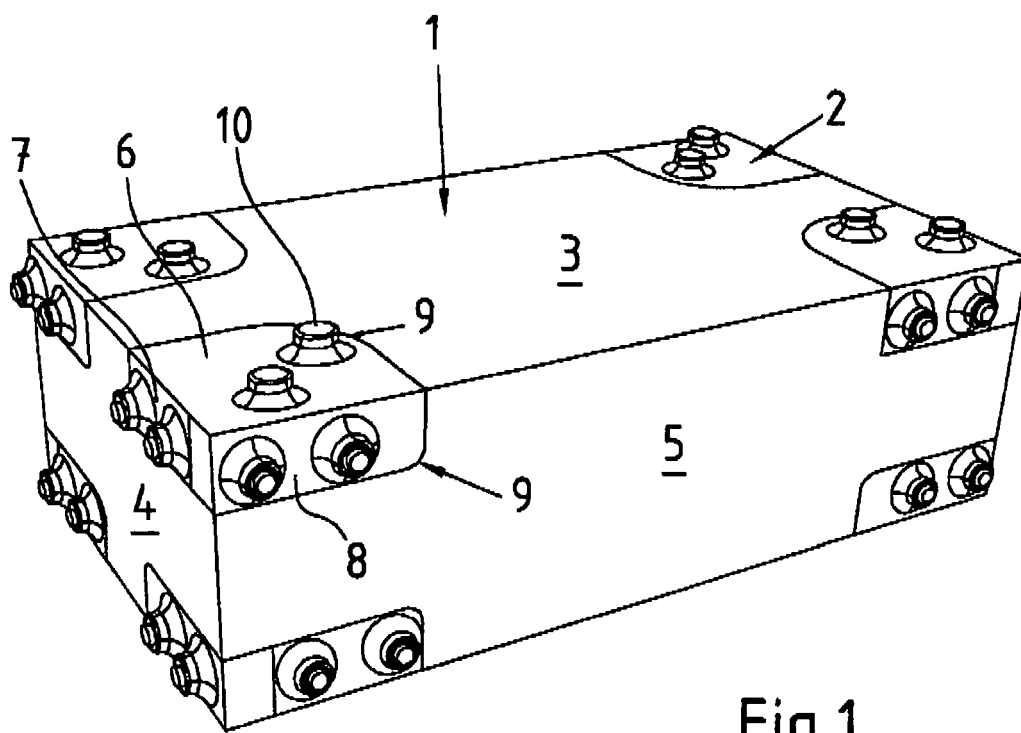
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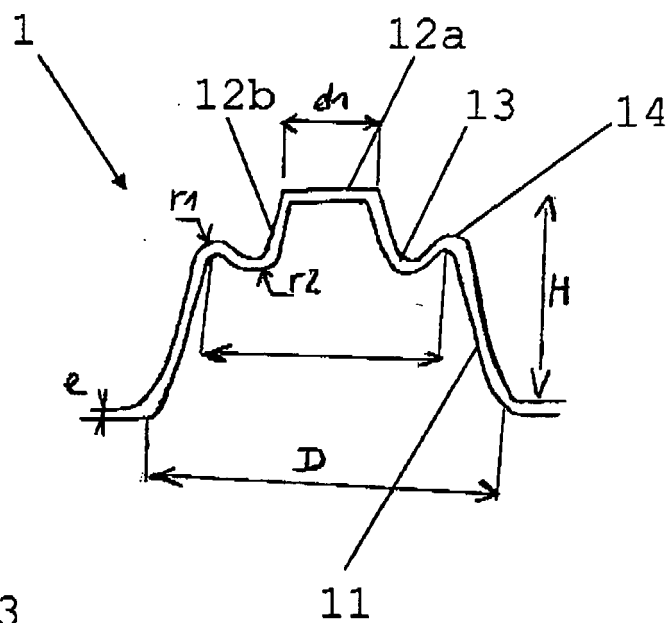


Fig. 3

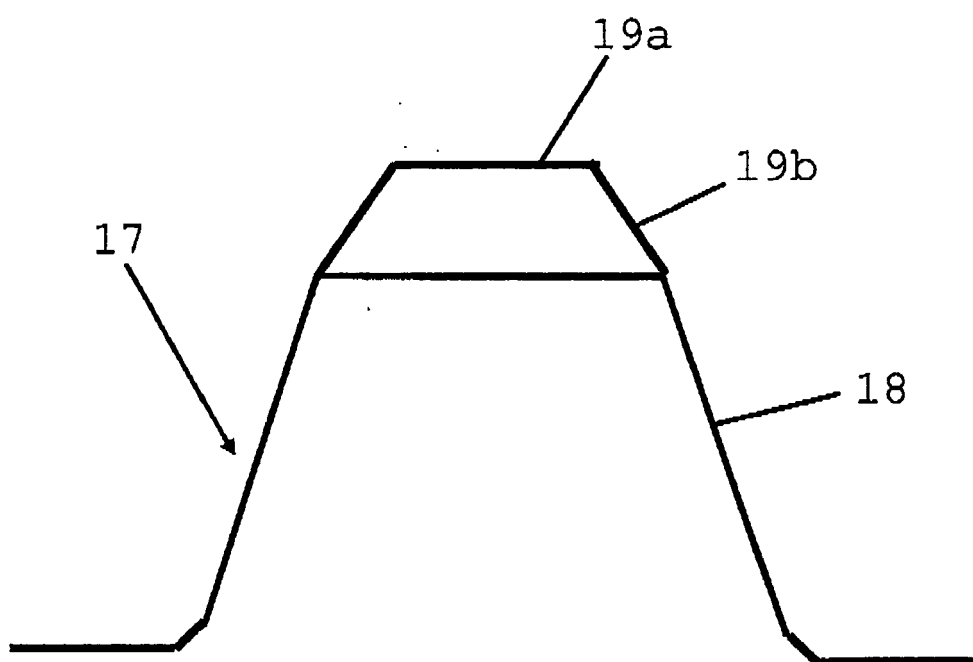


Fig. 4

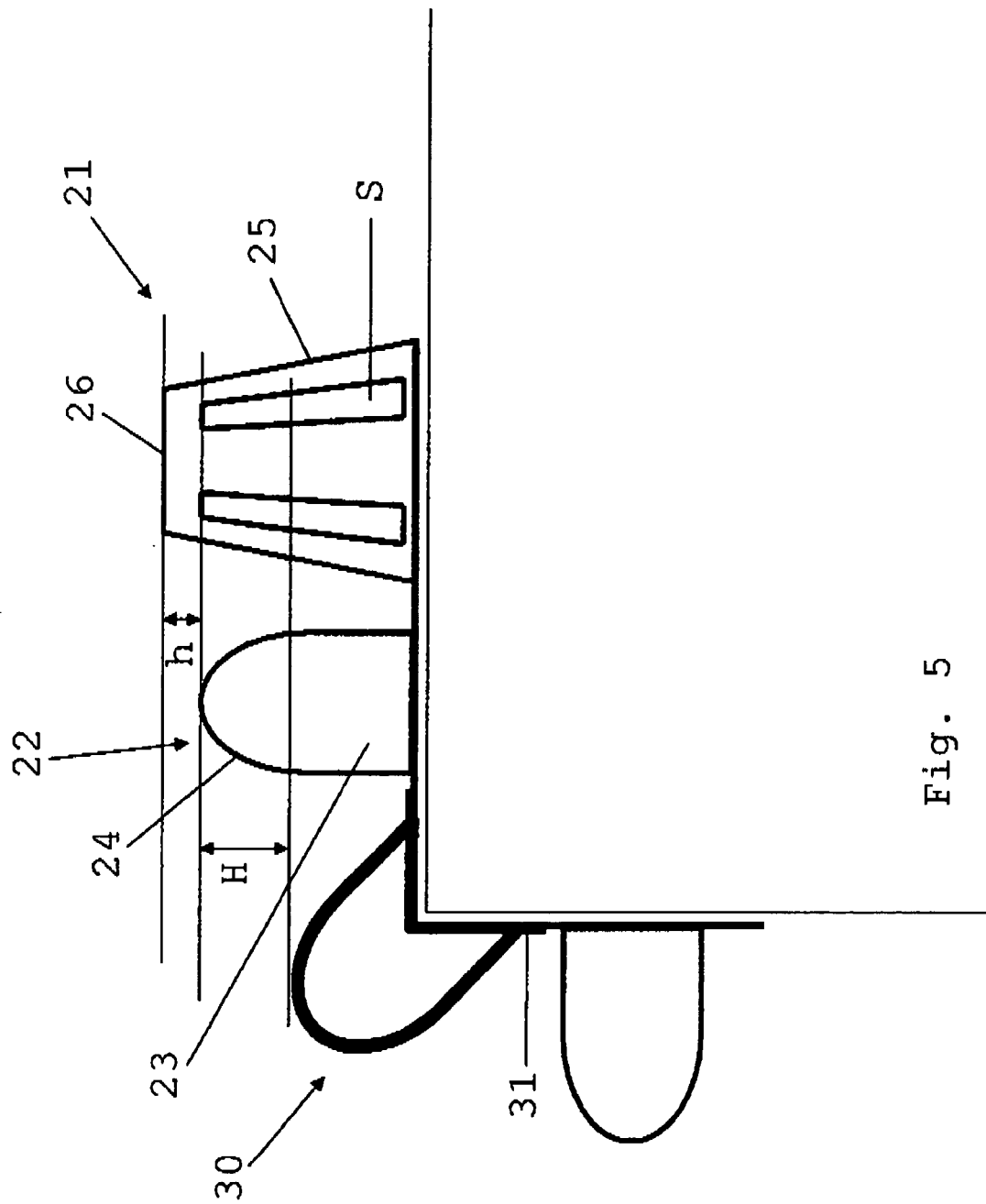


Fig. 5

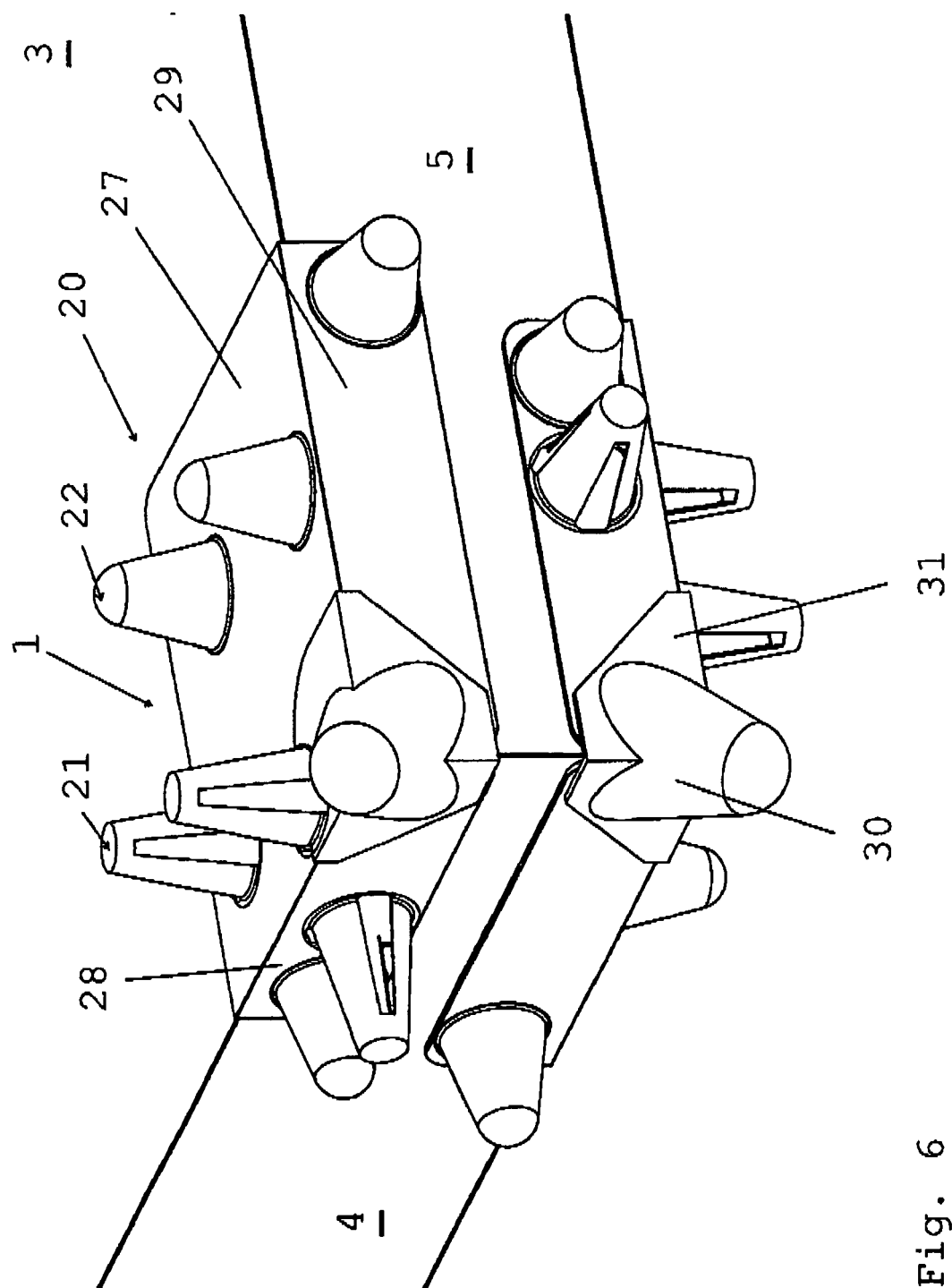


Fig. 6



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 00 8225

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 October 2007	Examiner Visentin, Mauro
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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