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(54) **PACKAGING HAVING A DAMPING ELEMENT**

(57) The present invention relates to packaging (1) having a plurality of walls (11) provided in a manner defining a storage volume (10) and for use in packaging of at least one product, particularly white goods. As an in-

novation, it comprises dilatant fluid (30) enclosed in at least one damping element (20) provided on the side of at least one of said walls (11) which faces said storage volume (10).

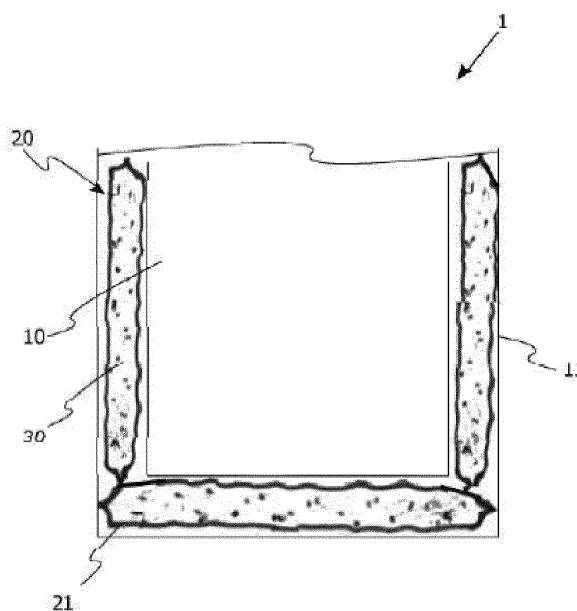


Figure 1

## Description

### TECHNICAL FIELD

**[0001]** The invention relates to packaging according to the introductory section of Claim 1.

### KNOWN STATE OF THE ART

**[0002]** Packaging is a material which ideally protects the product within it in line with the product's structure and form, ensures that the product remains clean, facilitates the transport of the product, and at the same time advertises the product.

**[0003]** Currently, products in the white goods sector are usually packaged using expanded polystyrene (EPS). The product is at risk of a fall or impact from the moment it is packaged until it reaches the consumer. If the product is damaged as the result of a fall, it becomes unusable, and when a product which is ready for sale becomes unsaleable, this represents a loss of resources. In high volume production operations, even a small proportion of such losses results in serious costs. Consequently, products are made to undergo a drop test before leaving the factory. In such a test, a product which is ready to leave the factory is used, and since the tests are carried out frequently, the testing is rather costly.

**[0004]** In the known state of the art, particularly in packaging for combi boilers, polystyrene foam is used to surround the combi within the carton. It has been identified in impact tests that even when polystyrene material is used as an impact absorber for combi boilers, it will not absorb all of the energy within the combi boiler carcass and internal components at the moment of falling or impact, and this may cause damage to the combi boiler.

**[0005]** Patent application number WO0046303 concerns an energy absorbing environment which stiffens proportionally to the force applied in order to distribute the energy of the applied force. The polymeric-based compound includes a polymer, a lubricant and a fill material to produce a conformal absorber which demonstrates dilatant characteristics when subjected to high forces or stress ratios (shear thickening). The new environment includes a diluted expanded cross-linked viscoelastic polymer compound which has chemical bonds which are broken preferentially under a high deformation rate but are renewable by reforming under static conditions.

### BRIEF EXPLANATION OF THE INVENTION

**[0006]** The purpose of the invention is to provide a packaging structure with high impact resistance for use in product packaging, especially for white goods.

**[0007]** The present invention concerns a packaging with a plurality of walls provided to define a storage volume for use in packaging at least one product, especially white goods. To this end, it comprises dilatant fluid en-

closed in at least one damping element provided on the side which faces the said storage volume of at least one of the said walls. It is thereby ensured that if the packaging is subjected to impact, the energy of the impact is absorbed, preventing the product from being affected by the impact.

**[0008]** In one possible embodiment of the invention, the said damping element is a capsule with an elastic structure. In this way, the dilatant fluid is located within a flexible structure.

**[0009]** In one possible embodiment of the invention, the damping element contains a first plate and a corresponding second plate, and at least one sealing element which ensures a seal between the said first plate and second plate. A structure is thereby provided which permits flexibility of movement for the dilatant fluid.

**[0010]** In one possible embodiment of the invention, there is at least one first extension extending from the first plate towards the second plate, and at least one second extension extending from the second plate towards the first plate, and a sealing element located between said first extension and said second extension so that the elements engage with each other telescopically. It is thereby ensured that a closed volume is provided between the first plate and the second plate.

**[0011]** In one possible embodiment of the invention, at least one of either the first extension or the second extension includes at least one housing to provide positioning of the said sealing element. It is thereby ensured that the position of the sealing element is secured within the closed volume.

**[0012]** In one possible embodiment of the invention, there is at least one resting surface and at least one stopping surface corresponding to and facing the other on any one of the first extension or the second extension, in order to ensure that the first plate and the second plate halt when there is a minimum distance between them. It is thereby ensured that there is a predetermined distance between the first plate and the second plate.

**[0013]** In one possible embodiment of the invention, there is an extension housing forming a recess on the stopping surface formed on the side of any one of the first plate or the second plate, which faces the other. It is thereby ensured that at least one of the extensions which engage telescopically is secured by entering the housing on the opposite plate.

**[0014]** In one possible embodiment of the invention, the damping element has a plurality of capsules positioned between a first plate and a second plate which correspond to one another. It is thereby ensured that the dilatant fluid is located within a capsule between the corresponding plates.

**[0015]** In one possible embodiment of the invention, the damping element contains at least one holder in order to secure the product in position within the storage volume. It is thereby ensured that the position of the product is secured within the storage volume.

## BRIEF EXPLANATION OF THE FIGURES

### [0016]

Figure 1 provides a representational side view of a capsule containing dilatant fluid attached to the walls of the packaging which is the subject of the invention.

Figure 2 provides a representational side view of the dilatant fluid located between corresponding plates within the packaging which is the subject of the invention.

Figure 3 provides a representational side view of a plurality of capsules containing dilatant fluid located between corresponding plates in the packaging which is the subject of the invention.

## DETAILED EXPLANATION OF THE INVENTION

[0017] In this detailed explanation, the packaging which is the subject of the invention (1) is explained with examples which are given only in order that the subject may be more clearly understood and shall in no way constitute any restrictive effect whatsoever.

[0018] Referring to Figure 1: the packaging (1) which is the subject of the invention comprises a plurality of walls (11) provided so as to define a storage volume (10) and a dilatant fluid (30) enclosed in at least one damping element (20) provided on the side of the said walls (11), at least one of which faces the said storage volume (10).

[0019] In a preferred embodiment of the invention, the damping element (20) provided on a side facing the storage volume (10) on at least one of the plurality of walls (11) provided so as to define a storage volume (10) of the packaging (1) may be one capsule (21) of elastic structure. The said elastic structure may be a nylon-based polymer.

[0020] Figure 2 shows a representational side view of the dilatant fluid (30) located between the corresponding plates within the packaging (1) which is the subject of the invention. The said damping element (20) which is located on at least one of the said plurality of walls (11) may be a first plate (22) and a second plate (23) which correspond to one another. There may be at least one first extension (221) extending from the first plate (22) towards the second plate (23) and at least one second extension (231) extending from the second plate (23) towards the first plate (22). The said first extension (221) and the second extension (231) may be positioned in such a manner that they engage telescopically. At least one of either the first extension (221) or the second extension (231) may have at least one housing (222) in which at least one sealing element (24) is positioned in order to provide a seal. In order to ensure that the first plate (22) and the second plate (23) are supported when there is a minimum distance between them, there may be, on any one of the first plate (22) or the second plate

(23), at least one resting surface (232) and at least one stopping surface (223) corresponding to and facing the other. The dilatant fluid (30) may also be located directly in the area between the first plate (22) and the second plate (23).

[0021] Figure 3 provides a representational side view of a plurality of capsules (21) containing dilatant fluid (30) located between the corresponding plates in the packaging (1) which is the subject of the invention. In an alternative embodiment of the invention, the damping element (20) may have a plurality of capsules (21) positioned between a first plate (22) and a second plate (23) which correspond to one another. The structure of the said capsules (21) may be cylindrical, spherical, in the form of cubic prisms, polygonal prisms or similar forms. There may be at least one first extension (221) extending from the first plate (22) towards the second plate (23) and at least one second extension (231) extending from the second plate (23) towards the first plate (22). In order to ensure that there is a predetermined distance between the first plate (22) and the second plate (23), there may be on any one of the first extension (221) or the second extension (231) at least one resting surface (232) and at least one stopping surface (223) corresponding to and facing the other. The said stopping surface (223) provided on either the first plate (22) or the second plate (23) facing the other may be situated within an extension housing (224) forming a recess. It is thereby ensured that either the first extension (221) or the second extension (231) which engage telescopically is secured in an extension housing (224) provided opposite thereto to form a predetermined distance between the first plate (22) and the second plate (23).

[0022] In the structure of the packaging (1), there may be at least one holder (25) extending from either the first plate (22) or the second plate (23) aligned with the lateral surface at the side of the storage volume (10), as may be seen in Figure 2, in order to ensure the securing of the product positioned within the storage volume (10). This ensures that the product positioned within the storage volume (10) is secured.

[0023] The scope of the protection of the invention is specified in the claims and may not be held to be limited by whatever is described, for the purpose of illustration, in this detailed explanation. This is because it is clear that a person skilled in the art may, in light of what is related above, and without departing from the main theme, produce similar configurations.

## REFERENCE NUMBERS

### [0024]

1 Packaging

10 Storage Volume

11 Wall

20 Damping element



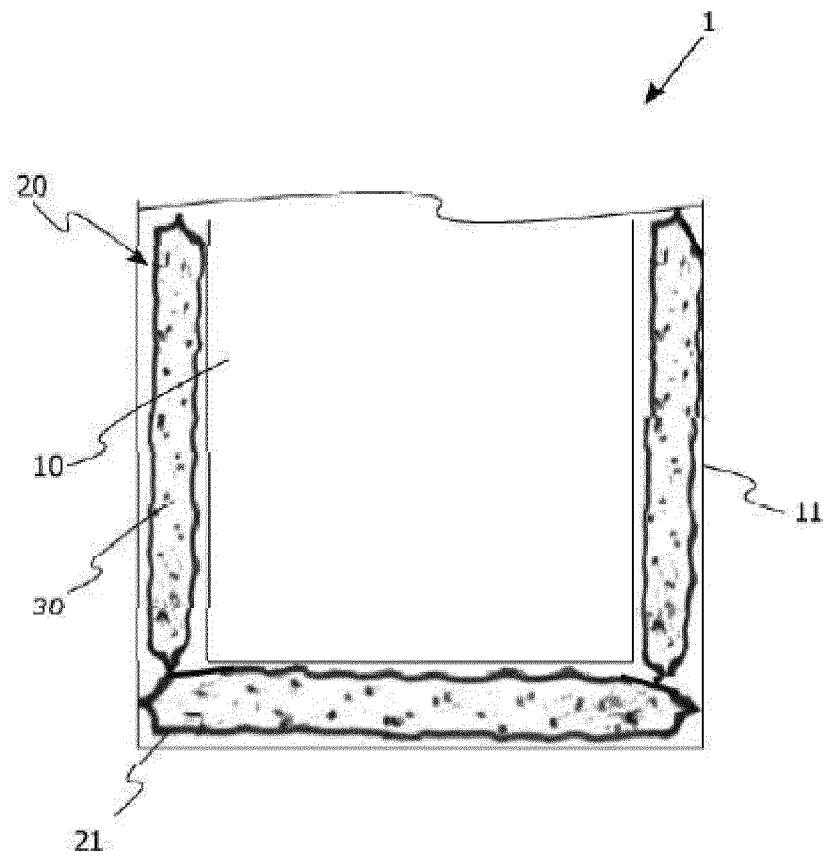


Figure 1

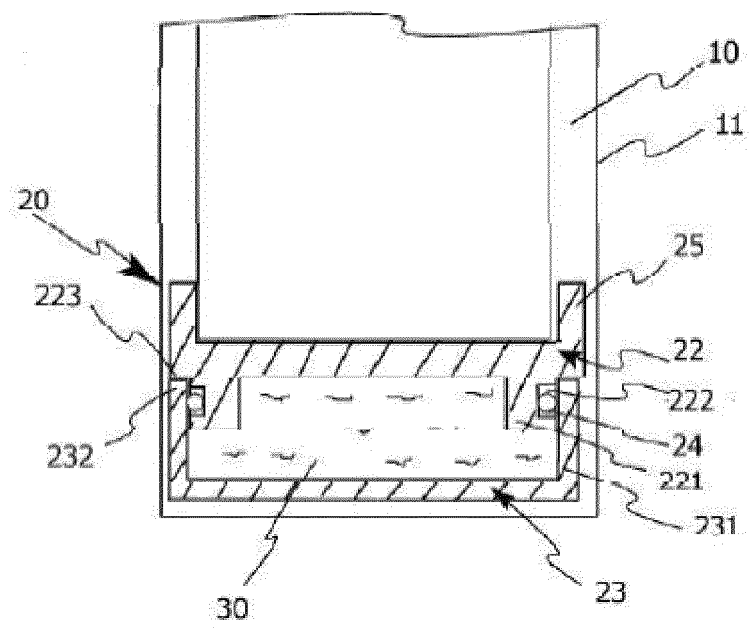


Figure 2

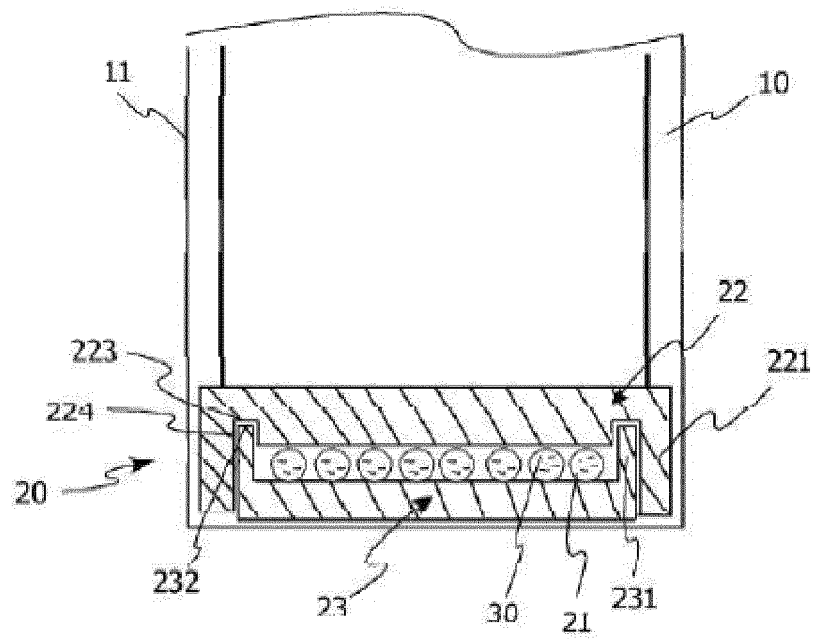


Figure 3

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- WO 0046303 A [0005]