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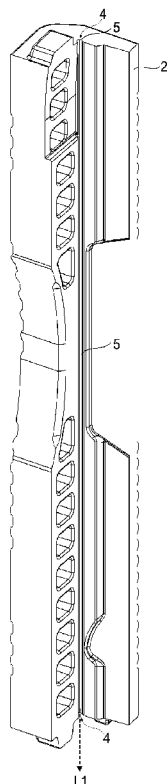
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(54) Title: IMPROVED PROTECTIVE PACKAGING ASSEMBLY FOR A HOUSEHOLD APPLIANCE

Fig. 1



(57) Abstract: The present invention relates to a protective packaging assembly (1) for a relatively large and heavy household appliance such as a laundry washer. The protective packaging assembly (1) comprises: two front edge protectors (2) and two rear edge protectors (3) each made from foam material and each adapted to cushion the respective vertical edge of the household appliance, wherein the front edge protectors (2) and the rear edge protectors (3) are adapted to be laterally held by the clamping jaws of a forklift for lifting/transporting the household appliance. In the protective packaging assembly (1) of the present invention, each front edge protector (2) and each rear edge protector (3) comprises a groove (4) which is formed into its entire vertical inner edge (5) that faces the respective vertical edge of the household appliance, wherein the groove (4) extends in a first direction (L1) which is parallel to the vertical direction.

Description**IMPROVED PROTECTIVE PACKAGING ASSEMBLY FOR A HOUSEHOLD APPLIANCE**

- [0001] The present invention relates to a protective packaging assembly for packing a relatively large and heavy household appliance, in particular a laundry washer, a laundry dryer, dishwasher or a refrigerator. The present invention more particularly relates to the front/rear edge protectors of the protective packaging assembly.
- [0002] In general, household appliances must withstand relatively high mechanical stresses during the various stages of the transportation. These mechanical stresses are generated by the transportation devices such as forklifts with clamping jaws. These mechanical stresses are practically unavoidable. In order to mitigate the adverse effects of the clamping forces, a household appliance is generally packed with a protective packaging assembly which cushions it from inevitable knocks. Protective packaging assemblies are commonly known in the art. A protective packaging assembly generally comprises: a plurality of front/rear edge protectors for respectively cushioning the vertical edges of the household appliance; a bottom protector for cushioning the bottom of the household appliance and a top protector for cushioning the top of the household appliance. In general, the front/rear edge protectors are connected at their opposite ends with the bottom protector and the top connector. The front/rear edge protector, the bottom protector and the top protector are commonly made from a resilient foam material such as expanded polystyrene. During an ordinary impact, the foam material partly absorbs the energy of the impact and usually recovers its initial shape.
- [0003] EP1386853A1 discloses a prior art protective packaging assembly which comprises front/rear edge protectors.
- [0004] A problem with the protective packaging assembly is that there are incidents where the clamping jaws of the transportation device damages one or more front/rear edge protectors. Such incidents happen when the clamping force exerted by the clamping jaws is excessively high or unbalanced. Such incidents may also happen when the number of

household appliances held together by the clamping jaws doesn't correctly match the capacity of the forklift. In such incidents, the front/rear edge protectors are likely to be fractured and thus lose their cushioning function. Moreover, if the clamping jaws are used to hold the household appliance again after one or more front/rear edge protectors have already been fractured then the household appliance receives damages, in particular the side walls which experience the clamping force become deformed. In such incidents, the household appliances must be repaired and repacked through the service. Moreover, the user complaints increase. It is of utmost importance that the household appliance is properly packed with the protective packaging assembly in order to ensure that the household appliance can be delivered in an undamaged state.

[0005] An objective of the present invention is to provide a protective packaging assembly for a household appliance which solves the aforementioned problems of the prior art in a cost-effective way and which enables an improved reliability and safety during the transportation of the household appliance with clamping jaws of the forklift.

[0006] This objective has been achieved by the protective packaging assembly as defined in claim 1. Further achievements have been attained by the subject-matters respectively defined in the dependent claims.

[0007] In the protective packaging assembly of the present invention, each front edge protector and each rear edge protectors comprise a groove which is formed into its entire vertical inner edge that faces the respective vertical edge of the household appliance, wherein the groove extends in a first direction which is parallel to the vertical direction.

[0008] A major advantageous effect of the present invention is that the risk that the front/rear edge protector fractures when the household appliance is laterally held by clamping jaws of the forklift is eliminated or reduced as much as possible by virtue of the grooves. Thereby, the resilience performance of the protective packaging assembly against impacts generated by the clamping jaws of the fork lift has been improved and thus the household appliance can be delivered in an undamaged state and free of any fractures in the protective packaging assembly. Another major

advantageous effect of the present invention is that the overall costs can be reduced both in material and labor. With the present invention, the consumer satisfaction can be increased.

- [0009] In alternative embodiments one or more grooves each deepens parallelly, vertically or obliquely to the respective side surface of the household appliance. These embodiments are particularly advantageous as the stress at the vertical inner edges can be considerably reduced and the resilience performance of the front/rear edge protectors can be improved and thus the risk of fracturing the protective packaging assembly with the clamping jaws can be eliminated or reduced as much as possible. Test results have shown that the resilience performance improves in comparison to the conventional rear/front edge protectors when the grooves deepen parallelly or vertically with respect to the side surface of the household appliance. Additional test results have also shown that the resilience performance even further improves when the grooves deepen obliquely with respect to the side surface of the household appliance. In particular, it has been shown that the best resilience performance is obtained at 45 degrees. However, in the range of 30 degrees to 60 degrees the resilience performance becomes ideal to prevent fracturing of the protective packaging assembly through the clamping jaws during the transportation.
- [0010] In another embodiment, the width w of the groove ranges between 4 mm to 6 mm. In another embodiment, the width w of the groove is 5 mm. These embodiments are particularly advantageous as the resilience performance of the front/rear edge protectors can be further improved by adjusting the width of the grooves.
- [0011] In another embodiment, the groove has a u-shaped cross section. This embodiment is particularly advantageous as the resilience performance of the front/rear edge protectors can be further improved by adjusting the shape of the grooves.
- [0012] In another embodiment, the foam material of the front/rear edge protectors comprises expanded polystyrene. Alternatively other type of foam material known to those skilled in the art may be used.

- [0013] Additional features and additional advantageous effects of the protective packaging assembly of the present invention will become more apparent with the detailed description of the embodiments with reference to the accompanying drawings in which:
- [0014] Figure 1 - is a schematic perspective view of a front edge protector of a protective packaging assembly according to an embodiment of the present invention;
- [0015] Figure 2 - is another schematic perspective view of the front edge protector of Fig. 1;
- [0016] Figure 3 - is a schematic top view of the front edge protector of Fig. 1;
- [0017] Figure 4 - is a schematic perspective view of a rear edge protector of a protective packaging assembly according to an embodiment of the present invention;
- [0018] Figure 5 - is another schematic perspective view of the rear edge protector of Fig. 4;
- [0019] Figure 6 - is another schematic top view of the rear edge protector of Fig. 4.
- [0020] The reference signs appearing on the drawings relate to the following technical features.
1. Protective packaging assembly
 2. Front edge protector
 3. Rear edge protector
 4. Groove
 5. Vertical inner edge
- [0021] L1: The 1st direction which is parallel to the vertical direction;
- [0022] L2: The 2nd direction which is parallel to side surface of the household appliance;
- L3: The 3rd direction which is vertical to the side surface of the household appliance;
- [0023] L4: The 4th direction which is slanted with respect to the side surface of the household appliance;
- [0024] α : The angle of the 4th direction with respect to the side surface of the household appliance;

- [0025] w: The width of the groove (4).
- [0026] The protective packaging assembly (1) is suitable for use with a relatively large and heavy household appliance (not shown) such as a laundry washer, a laundry dryer, a laundry washer-dryer, a dishwasher, an oven or a refrigerator.
- [0027] The protective packaging assembly (1) comprises two front edge protectors (2) and two rear edge protectors (3) each made from foam material and each adapted to cushion the respective vertical edge of the household appliance (Fig. 2 and Fig. 5). The front edge protectors (2) and the rear edge protectors (3) are further adapted to be laterally held by the clamping jaws of a forklift (not shown) for lifting/transporting the household appliance.
- [0028] In the protective packaging assembly (1) of the present invention each front edge protector (2) and each rear edge protector (3) comprises a groove (4) which is formed into its entire vertical inner edge (5) that faces the respective vertical edge of the household appliance. The groove (4) extends in a first direction (L1) which is parallel to the vertical direction (Fig. 1 and Fig. 4).
- [0029] In an embodiment (not shown), one or more grooves (4) each deepens in a second direction (L2) which is parallel to the respective side surface of the household appliance.
- [0030] In another embodiment (not shown), one or more grooves (4) each deepens in a third direction (L3) which is vertical to the respective side surface of the household appliance.
- [0031] In another embodiment, one or more grooves (4) each deepens in a fourth direction (L4) which is slanted with respect to the respective side surface of the household appliance (Fig. 3 and Fig. 4).
- [0032] In another embodiment, the fourth direction (L4) makes an angle α which ranges between 30 degrees to 60 degrees with respect to the respective side surface of the household appliance (Fig. 3 and Fig. 4).
- [0033] In another embodiment, the fourth direction (L4) makes an angle $\alpha = 45$ degrees with respect to the respective side surface of the household

appliance (Fig. 3 and Fig. 4).

- [0034] In another embodiment, the width w of each groove (4) ranges between 4 mm to 6 mm. In this embodiment, the depth of each groove (4) also ranges between 4 to 6 mm. (Fig. 3 and Fig. 4).
- [0035] In another embodiment, each groove (4) has a u-shaped cross section (Fig. 3 and Fig. 4).
- [0036] In another embodiment, the foam material of the two front edge protectors (2) and the two rear edge protectors (3) comprises expanded polystyrene.
- [0037] A major advantageous effect of the present invention is that the risk that the front/rear edge protectors (2,3) fractures when the household appliance is laterally held by clamping jaws of the forklift is eliminated or reduced as much as possible by virtue of the grooves (4) (Fig. 1 and Fig. 4). Thereby, the resilience performance of the protective packaging assembly (1) against the impacts which are generated by the clamping jaws of the fork lift has been improved and thus the household appliance can be delivered in an undamaged state and free of any fractures in the protective packaging assembly (1). Another major advantageous effect of the present invention is that the overall costs can be reduced both in material and labor. With the present invention, the consumer satisfaction can be increased. Other additional advantageous effects of the present invention can be taken from the aforementioned embodiments.

Claims

1. A protective packaging assembly (1) for a relatively large and heavy household appliance such as a laundry washer, a laundry dryer, a laundry washer-dryer, a dishwasher, an oven or a refrigerator, the protective packaging assembly (1) comprising two front edge protectors (2) and two rear edge protectors (3) each made from foam material and each adapted to cushion the respective vertical edge of the household appliance, wherein the front edge protectors (2) and the rear edge protectors (3) are further adapted to be laterally held by the clamping jaws of a forklift for lifting/transporting the household appliance, the protective packaging assembly (1) being **characterized in that** each front edge protector (2) and each rear edge protector (3) comprises a groove (4) which is formed into its entire vertical inner edge (5) that faces the respective vertical edge of the household appliance, wherein the groove (4) extends in a first direction (L1) which is parallel to the vertical direction.
2. The protective packaging assembly (1) according to claim 1, **characterized in that** one or more grooves (4) each deepens in a second direction (L2) which is parallel to the respective side surface of the household appliance.
3. The protective packaging assembly (1) according to claim 1 or 2, **characterized in that** one or more grooves (4) each deepens in a third direction (L3) which is vertical to the respective side surface of the household appliance.
4. The protective packaging assembly (1) according to any one of claims 1 to 3, **characterized in that** one or more grooves (4) each deepens in a fourth direction (L4) which is slanted with respect to the respective side surface of the household appliance.
5. The protective packaging assembly (1) according to claim 4, **characterized in that** the fourth direction (L4) makes an angle α which ranges between 30 degrees to 60 degrees with respect to the respective side surface of the household appliance.
6. The protective packaging assembly (1) according to claim 4, **characterized in that** the fourth direction (L4) makes an angle $\alpha = 45$ degrees with respect to the respective side surface of the household appliance.
7. The protective packaging assembly (1) according to any one of claims 1 to 6, **characterized in that** the width w of each groove (4) ranges between 4 mm to 6

mm.

Fig. 1

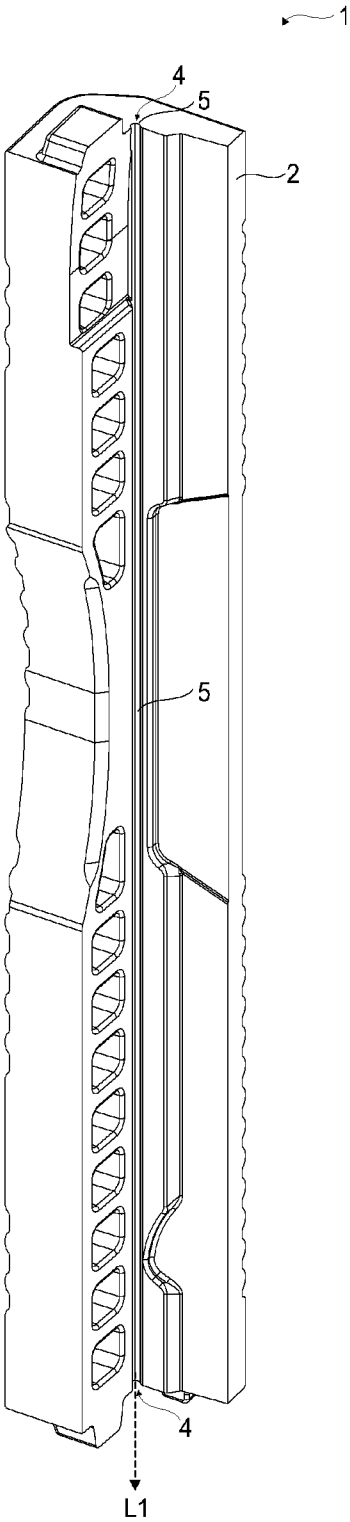


Fig. 2

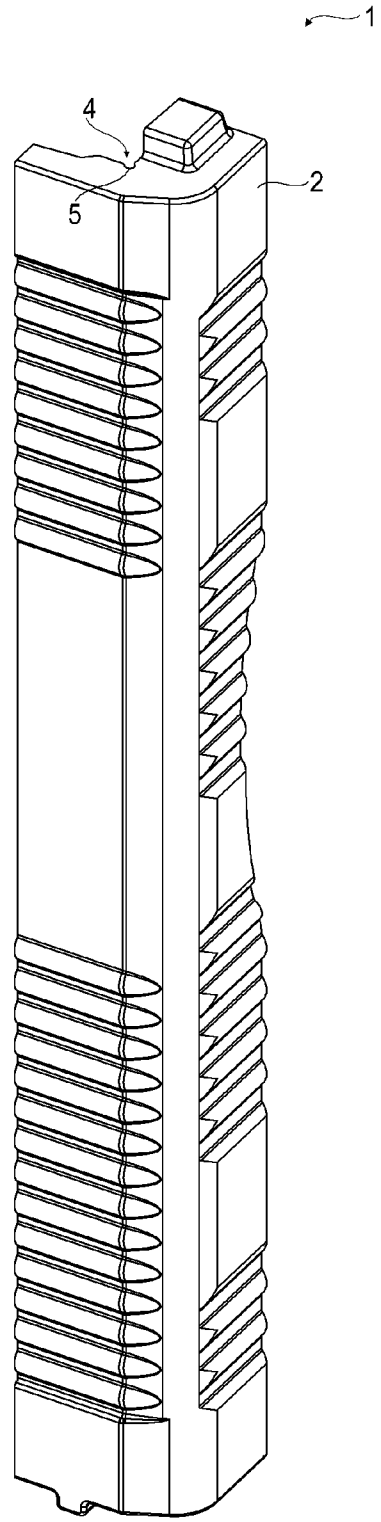


Fig. 3

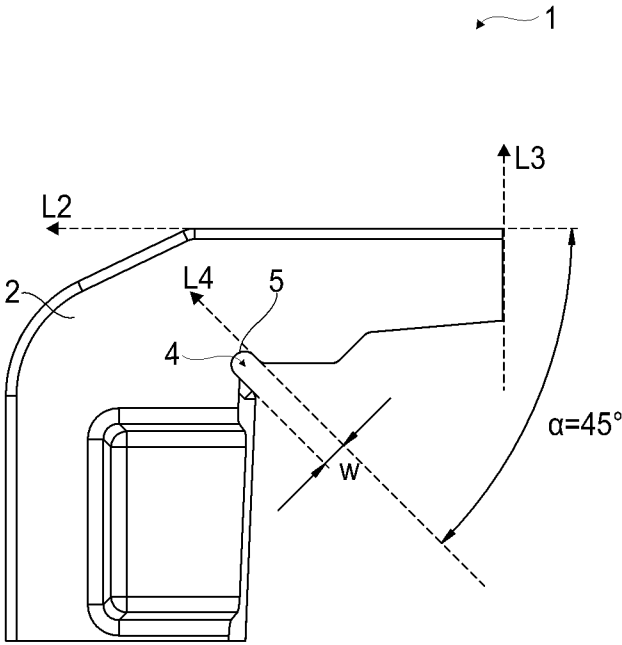


Fig. 4

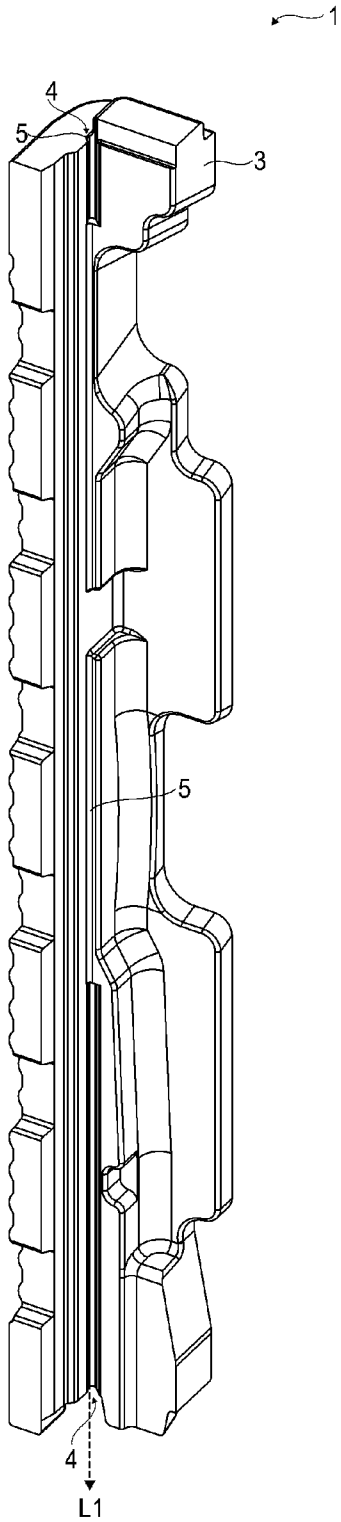


Fig. 5

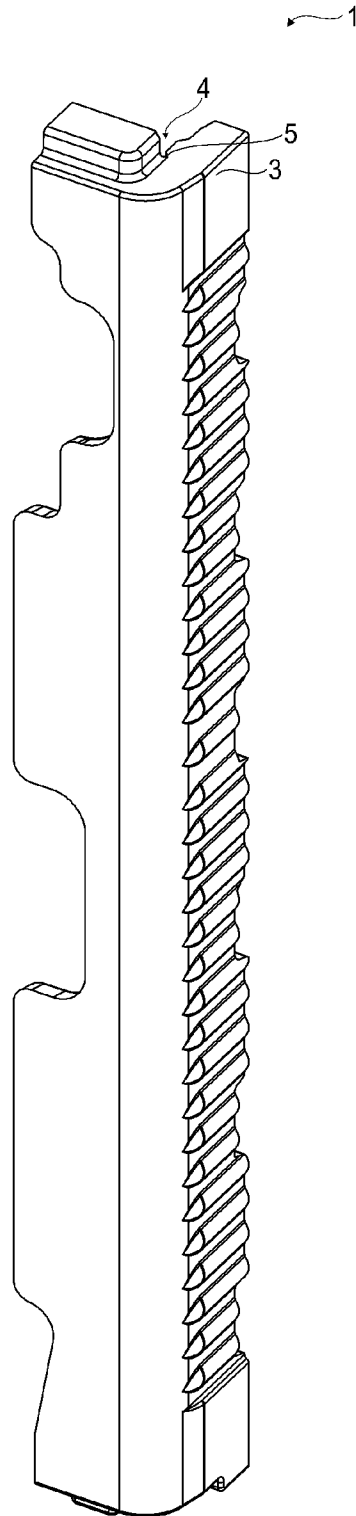
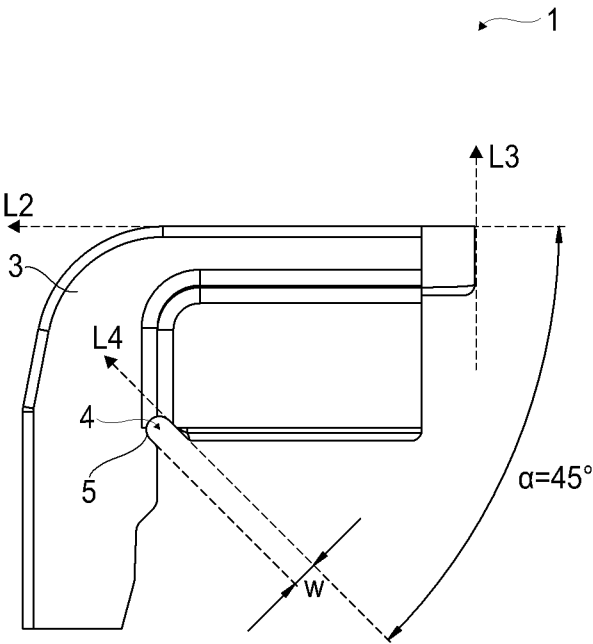


Fig. 6



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/075906

A. CLASSIFICATION OF SUBJECT MATTER
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ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 295 404 A1 (SIGNODE SYSTEM GMBH [DE]) 21 December 1988 (1988-12-21) abstract; figure 2 column 2, last paragraph - column 3, paragraph 2	1-7
X	----- US 6 286 683 B1 (HUNT JOHN F [US] ET AL) 11 September 2001 (2001-09-11) abstract; figures 1,2 column 2, line 43 - column 3, paragraph 4 column 4, line 17 - last line; figure 4	1-7
X	----- US 4 483 444 A (GARDNER ROLAND C [US]) 20 November 1984 (1984-11-20) column 3, line 8 - column 5, line 58; figures 1,1a,3 ----- -/--	1-7



Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

13 June 2016

Date of mailing of the international search report

21/06/2016

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/075906

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 386 853 A1 (ELECTROLUX HOME PROD CORP [BE]) 4 February 2004 (2004-02-04) cited in the application abstract; figure 2A paragraph [0016]; claims 1,5 -----	1-7

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2015/075906

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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