

The present invention concerns a packaging bolster and a container for such a bolster. It also concerns a packing process implementing such a bolster. It is applied in the field of packing and packaging of solid but fragile objects, intended to be stored and transported.

The prior art discloses packaging bolsters are known which are interposed between the packed product and the case intended to contain it (see for example DE-U-7 825 628). According to current practice, the person skilled in the part knows that angled bolsters are available which make it possible to damp accelerations which are too sudden (chiefly shocks) and to remove the product packed in its container. Such bolsters are produced in synthetic materials such as polystyrene. Corner bolsters have the first disadvantage of requiring lengthy positioning and being practically impossible to automate.

Another solution which improves bolstering, and particularly the handling of bolsters, proposes half-shells made of plastic material, the shape of which is entirely enveloping and is easier to handle. However, when inserted into the case, the shells have to be held by the free end and they tend to move away from the product to be bolstered and, in extreme cases, allow it to escape.

A disadvantage common to both prior solutions is the requirement of considerable storage space before use. Indeed, the bolsters remain in the warehouse before moving to the transfer line, and the space they occupy is wasted for the rest of the undertaking's activities.

The present invention makes it possible to remedy these disadvantages of the prior art. Its first aim is to reduce storage volume in the warehouse before use on the transfer line.

A second aim of the present invention is to allow the packing process to be made almost completely automatic thus avoiding, on

the one hand, recourse to human handling and, on the other hand, the risk of costly handling errors.

For these purposes, the invention concerns a packaging bolster intended to be inserted in a pack for protecting a product to be packed. It is characterised chiefly by the fact that it is produced as a single part made of plastic material in the form of a continuous strip which can be cut to the necessary size so as to surround the product at least partially. Moreover, along the whole length of the strip of bolster it comprises a U-shaped groove intended to receive and hold the product.

The invention also concerns a means for storing a bolster designed as described above. Such a means comprises a component for compressing and unrolling a length of bolster as required, the rest of the bolster remaining in compressed form so as to limit storage volume.

The invention also concerns an automatic packing process which is characterised in that the bolster is disposed above the case, pulled out and then cut to the desired length, and then that a product to be packed is disposed above the container/bolster assembly and applied so as to be installed in the container, positioning taking place in a natural manner.

It will be easier to understand other advantages of the present invention with the aid of the attached description and drawings, which are:

- Figure 1: a diagram of an embodiment of the bolster according to the invention,
- Figure 2: a diagram of part of the transfer line using the bolster and the bolster unroller according to the invention,
- Figure 3: a view during a pack, product and bolster installed according to the invention,
- Figures 4a and b: a diagram of a storage means according to the invention,

- Figure 5a and b: a diagram of another storage means according to the invention,
- Figure 6: a series of possible shapes of bolsters according to the invention,
- Figure 7: a diagram seen in section of another storage means according to the invention.

In the text, the term "case" is used in an equivalent manner to the term "pack" and the more generic one, "container". In particular, in a preferred embodiment, cases made of preformed cardboard are referred to.

Figure 1 shows an embodiment of one bolster according to the invention. Such a bolster is produced in the form of a long strip intended to surround the product to be packed. In a preferred embodiment, in order to produce an effect of lateral holding, the strip 1 is hollowed out, in an area for receiving the product to be packed, by a groove 2, the visible side wall 7 being intended to come into contact with the side walls of a case or container. In an embodiment shown in Figure 7, the face 142 of the product intended to come into contact with the receiving area 141 of the bolster is hollow in shape. It follows that the receiving area 141 of the bolster has to be a mating face 143 for this face 142 of the product so as to constitute an appropriate holding means. Similarly, the mating face 143 provided on the lower face of the bolster matches the shape 144 of the receiving area.

To allow improved storage and good bolstering in the container, the bottom of the strip is extended by a mating face 3 which is suitable for being embedded in the groove 2. In this way, the bolsters according to this embodiment may be stacked without losing space while thus constituting stable stacks in the storage rooms. Once cut, the bolsters may be stored in a container, the lid of which exerts pressure reducing their volume, if they are stacked.

Storage of this type is represented in Figures 6a and 6b [sic]. A container 50 is made of sheet metal, with an opening at the top. The container 50 comprises a base starting from which the bolsters, cut to size, are piled up. It may be noted that the first bolster 57 deposited on the bottom is crushed in its field of elastic deflection and that the groove 57a receives the mating face 58a of the following bolster 58.

The container 50 receives the bolsters in various volumes limited by plates 53-55. These plates are disposed so as to compress the bolsters already in storage, the inner wall comprising click-type fastening means 59 which make it possible to maintain pressure on the stored volume even during loading/unloading of the next volume.

Finally, a lid for the upper opening makes it possible to compress the last volume of stored bolsters and thus to keep in a small space a large number of bolsters ready for use.

In a preferred embodiment, the material in which the bolster is produced is a derivative of polyurethane and the volume compression rate reaches 80%.

In a preferred embodiment of the present invention, storage of the bolsters takes place before the bolsters are cut to the desired size. In contrast with the preceding storage method, the strip is stored in a roll and compressed so as to reduce even further the space occupied. Figure 7 [sic] shows a preferred embodiment of a container for strip bolsters before the operation of bolstering products to be packed.

In Figure 5b, the container is composed of two lateral end plates 71 and 72 through which is passed an axle 73 mounted on bearings 73a and 73b. Within the volume limited by the two end plates 71 and 72, the axis 73 carries a means for fastening the strip 74. The strip 74 drawn in Figure 7a [sic] is rolled in contiguous turns, the mating face 3 being embedded in the groove 2 of the bolster as drawn in Figure 1. To allow loading of the container,

one of the end plates 71 or 72 is removable. An end of the "bolster" strip is inserted between the compression rollers 76 and 77 and pulled out until it engages in the fastening means of the axle 73.

In a preferred embodiment, the two end plates are joined together by a solid circular shape intended to keep the rolled strip compressed inside its container. Such a form is produced by a steel sheet, generally cylindrical in form, the lids of which are the end plates 71, 72.

In the emptying phase, the bottom of the container comprises an opening 75 through which a desired length of bolster is pulled in strip form. Distribution is ensured by two rollers 76 and 77 which prevent the strip from expanding too much before leaving the container 70.

To understand the invention better, a representation has been given of the free end of the strip which will serve as a bolster once cut to the desired length. It comprises the groove 78 and the mating face 79. In general, a bolster according to the invention is always such that its cross section is provided with portions for holding the product. These portions go in the direction perpendicular to the plane in which the length of bolster is seen.

Returning to Figure 1, in a preferred embodiment according to the invention, it may be noted that the lower portion of the bolster intended to come into direct contact with the walls of the pack is provided with three slits 4-6 intended to improve the deflection of the bolster which has to bend around the product to be packed. These slits are obtained when hot by cutting with a trimming knife, for polyurethane bolsters. In other materials, they are made by moulding.

In a preferred embodiment, each slit occupies the whole available width of the contact face and is shaped like a T. When the bolster is bent opposite the slit, the vertical edges of the

latter move apart, preventing tearing from too great a displacement of the material in this location. On the other hand, the horizontal part of the T is deformed in an arc, producing a hinge.

Figure 2 shows a fully automatable packing line with the means of the invention. The bolster is stored in its container 9 and a length 8 is pulled so as to be positioned above the packaging area. Means 11-12 for cutting the strip are disposed so as automatically to match the length of bolster extracted from the container 9 to the requirements of the case and the product which are present in the packaging area. In the embodiment, the cutting means comprise a motorised chisel 11 and an anvil 12 to which the base of the strip is applied.

In the packaging area, a moving belt brings a case 13 which a robot, not shown but within the scope of the technical means of a person skilled in the art, holds open by its flaps 14. The case 13 rests by gravity on the moving belt and its opening faces up.

Above it, the bolster is disposed such that it is ready to come into the correct position in the case without additional handling. Above the assembly, transported by another transport means not shown but capable of being produced by a person skilled in the art, a product 15 generally parallelepipedic in form is brought. It is deposited by gravity in the groove 8a in the direction of the arrows drawn 15a-15d.

Depositing may be guided by the handling robot so as to improve the efficiency of the line relative to the case where gravity alone is exploited to cause the product to be placed in the container.

In the case of a product having an element of symmetry. the planes defined by the straight lines 15b, 15c on the one hand and 15d, 5a [sic] on the other hand, intersect the bolster between the hinges 8b and 8d, these being in directions that pass inside the case 13.

In this manner, depositing the product in the groove 8a of the bolster 8 installs the product in the bolster, and thrusts the whole inside the case without requiring any additional centring.

At the end of depositing, the face 8c of the bolster is applied against the base of the case 13 and the faces 8e and 8f are applied against the three side walls of the case 13, which are kept open. The face 8g of the bolster is still vertical, but the bolster having cleared the packaging area, a robot can manipulate the flap 14a then the flap 14b so as to apply the upper face of the product forcibly into the continuous groove 8a on the free part of the bolster.

At the end of the process, the belt 17 is run, which removes the loaded case 13 towards binding means, not shown. Finally, a fresh length of bolster is extracted from the container 9 and an empty case is brought up.

In another embodiment, the case or container is brought in an unmade-up form, such as a case made of flat cardboard or heat-shrinking plastic film. This embodiment, applicable to any packing element, such as flat cardboard or a sheet of thermoflexible synthetic resin, shows that it is possible to go even further with automating the packing process.

Figure 3 shows in vertical section a closed case containing a product packaged with the bolster and according to the process of the invention. The case 18 is closed and the bolster 21 completely surrounds the product 19. It is possible to see the groove 21a which here allows lateral holding in the direction perpendicular to the plane of the figure.

The hinges are three in number: 22 a, b, c. It will be noted that they comprise a central part formed of a greatly curved arc and laterally two linear edges in the mass of the bolster which make it possible to avoid reflecting the internal tensions caused by the great curve to the extreme edges of the bolster.

Other forms of bolsters may be imagined such as to allow the invention to be adapted to all sorts of packaging of single or multiple products, parallelepipedic or otherwise.

In particular, Figure 6 shows various possible shapes of bolsters with the product installed or not. The first bolster 80 comprises two grooves 81 and 83 which correspond to the mating faces 82 and 84. Such a bolster can receive two products side by side.

The second bolster 85 comprises a groove 88, concave in form, which corresponds to the reciprocal mating face 87. The product can then have a concave form of inner curve.

The third shape 90 does not have a mating face on its lower face (which is not however exclusive) but comprises a groove 91, the bottom of which is provided with two slits 92 and 93 intended to allow small unevennesses of the product to be housed in the bolster without undergoing too great a deformation reaction.



CLAIMS

1. A bolster for holding and protecting a product in its pack, said bolster (21) being produced as a single part made of plastic material in the form of a continuous strip which can be cut to the desired size so as to surround the product (19) at least partially, and comprising along the whole length of the strip of bolster a U-shaped groove (8a) intended to receive and hold the product.
2. A bolster according to Claim 1, characterised in that the contact face opposite the face of the bolster having the groove (8a) has the opposite shape to this upper face so as to allow improved stacking of the bolsters during storage.
3. A bolster according to Claim 1, characterised in that it is constituted in the form of a continuous strip, the lower part of which, intended to come into contact with the inner walls of the pack (13), carries pivoting means facilitating its folding when the product is surrounded.
4. A bolster according to Claim 3, characterised in that the pivoting means are composed of slits (4-6) in the solid mass, made from the contact face (3).
5. A bolster according to Claim 4, characterised in that each slit is produced over the whole available width of the bolster and that it takes the form of a T.
6. A bolster according to one of the preceding claims, characterised in that the groove (91) comprises means (92, 93) intended for receiving fragile unevennesses of the product in contact with the bolster (90).
7. A bolster according to one of Claims 2 to 6, characterised in that the mating shape (3), where one exists, is constituted along the whole length of the bolster (7).



8. A container intended to receive a continuous bolster according to one of Claims 1 to 7 comprising a mobile axle (73) between two end plates (71, 72), the two end plates, at least one of which is removable, being joined together by a solid circular shape intended to keep the rolled strip compressed, and the container comprising means for compressing and unrolling the bolster as required, composed of two compression rollers (76, 77), making it possible on the one hand to compress said bolster when inserted into said container, said bolster then being pulled out until it engages in the fastening means of the mobile axle (73), then rolled around said mobile axle and, on the other hand, to keep the bolster compressed when the latter is unrolled as required, preventing the latter from slackening off before it leaves the container.
9. A container intended to receive a set of slit bolsters ready for use according to one of Claims 1 to 7, comprising several sectors filled with compressed bolsters, kept in this state by lids (53-55) fastened by fasteners (59).
10. A process for packing products using a bolster according to one of Claims 1 to 7 consisting of:
 - bringing a bolster of a predetermined length into a packing area,
 - bringing a product (15) to be packed above a receiving area (8a) of the bolster,
 - bringing into the packing area and under the bolster a packing element (13) intended to receive the product in its bolster,
 - installing the product in the receiving area (8a) of bolster, and the bolster/product assembly in the packing element (13),
 - finally, closing (14, 14a) the packing element (13).