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H. GROENHUIS

2,868,437

PACKING TUBE

Filed April 22, 1954

2 Sheets-Sheet 1

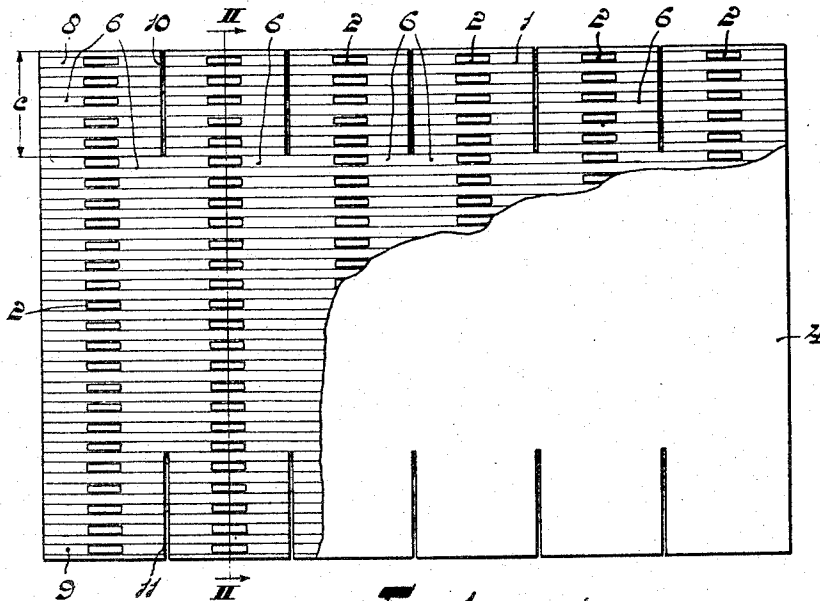


Fig. 1

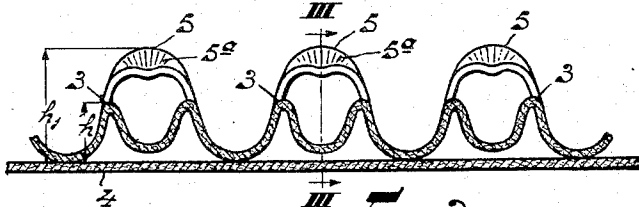


Fig. 2

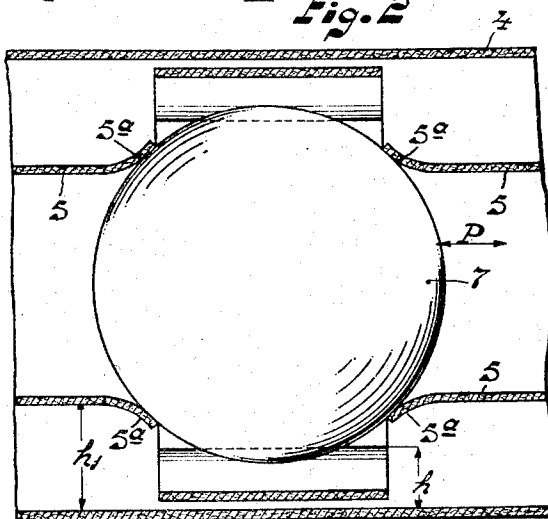


Fig. 3
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PACKING TUBE

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2 Sheets-Sheet 2

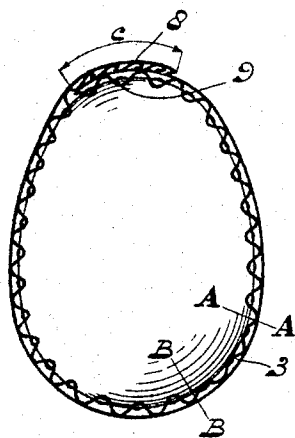


Fig. 4

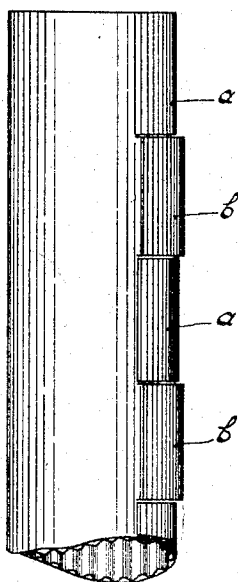


Fig. 5

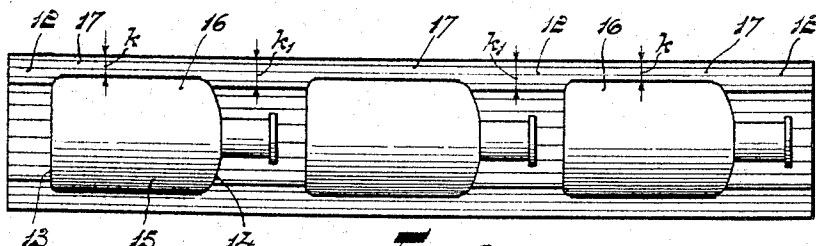


Fig. 6

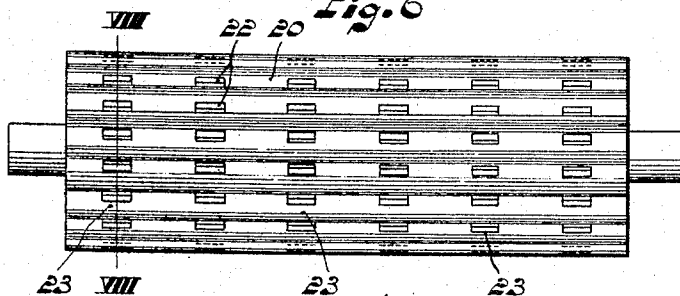


Fig. 7

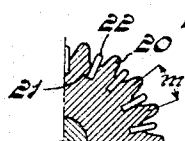


Fig. 8

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2,868,437

PACKING TUBE

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4 Claims. (Cl. 229—90)

The present invention relates to a packing tube for containing spaced fragile objects.

The transport of eggs from the egg market to the wholesale dealer and from there to the retail trader is usually effected in boxes in which the eggs are packed on racks of fibrous material. Thus a very satisfactory filling factor of the boxes is obtained and the shape of the racks reduces breakage of the eggs to a minimum. With the aid of these racks the retailer can take the eggs out of the box and store them on stands in his shops. With this packing method the shopkeeper supplies the eggs to this customer usually without packing. Since these racks are relatively costly due to their material and shape, they have a certain commercial value after having been used; this may give rise to complications, for example the return of the packing material.

Packing tubes for eggs, made from a folded sheet of corrugated paper, the ridges of which extend lengthwise inside the tube, are known, it is true, but they are never used on a large scale. Although this kind of packing is cheaper than the first-mentioned racks, it has never been used intensively probably since breakage of the eggs may occur.

The present invention has for its object to provide a construction of this kind of packing tube, which is extremely simple and in which the eggs can be transported substantially without the risk of breakage, as has been proved by experiments. In this case, the eggs may be handed over to the customer in their packing; the return of packing material may then be omitted, since the packing used is extremely cheap.

The packing tube of the aforesaid kind, which may be used not only for eggs but also for other damageable objects, has the feature that at the area of each of the objects stored in the tube the corrugated paper layer has a strip-shaped part extending transversely to the longitudinal direction of the tube, the corrugations of which have a smaller height and preferably also a smaller pitch than the corrugations on either side of such a strip-shaped part. At the boundary area between such a strip-shaped part of corrugations of smaller height and the adjacent tube parts having higher corrugations is formed a number of supporting points forming together a contact surface extending transversely to the direction of length of the tube. The stored object is then supported on this surface. Due to the fact that on the other side of such a strip-shaped part a similar contact surface is formed in opposite direction, the stored object is supported in two directions; if the tube surrounds the stored object intimately, this is found to be sufficient for the object to be held rigidly in the packing. The nature of the packing material also provides an elastic support for the stored objects at the area of the lower ridges.

If the stored objects are more or less cylindrical, and hence have more or less distinct end surfaces, the width of such a strip-shaped part may be chosen to be equal to the distance between two contact surfaces of the object. However, if the stored objects are more or less spherical or oval, it is advisable, in accordance with an advan-

2

tageous embodiment of the invention, to provide a dimension of the strip-shaped parts having ridges of smaller height in the direction of length of the tube which is smaller than the dimension of the object stored in the tube at the area of the said part, measured, also in the direction of length of the tube.

If the packing tube according to the invention is used for storing eggs, it is advisable, since the tubes filled with eggs are arranged vertically in an egg case, to arrange the eggs with their direction of length at right angles to direction of length of the tube. In this case, in the normal position of the case the eggs are thus not pointing downwards.

If the packing according to invention is used for storing a plurality of similar objects, of which the dimensions transverse to the direction of length of the tube are different, it is advisable in another embodiment of the packing according to the invention, to cut in at least one of the edges of the sheet of corrugated paper from which the tube is made at the area of the closing edge between two stored objects. Thus at one or at both edges serving as closing edges of the packing, between the cuts or slots, tongues are formed, which may be used for closing the packing. By means of these cuts the packing may be applied intimately to each packed object.

The packing is preferably closed by adhesion; in order to obtain a satisfactory adhesion of the paper sheet it is advantageous to flatten a few corrugations in the proximity of one of the edges of the corrugated sheet in the direction of the edge concerned and to secure the flattened part to the outer side of the opposite edge of the corrugated sheet.

Although the starting material for the packing could be made by securing to a smooth substratum side by side strips having a higher and lower ridges, the latter strips having, moreover if desired, a smaller pitch between the corrugations, it is to be preferred, in accordance with the invention, to pass a uniformly corrugated broad strip of paper over a fluted roller constructed in a manner such that it has teeth in one or more parts of its length, the pitch of these teeth being a whole fraction of the pitch of the other parts of the roller.

The packing of the present invention is suitable not only for eggs, but also for other damageable objects, for example glass lenses and turntables for sound equipment (the surfaces of which are to be protected from damage), polished objects and the like. In transporting damageable objects it is advantageous to have a cheap, simple packing available, which protects the packed objects from damage.

In order that the invention may be readily carried into effect, it will not be described with reference to the accompanying drawing, wherein:

Fig. 1 is an exploded view of a sheet of corrugated paper in accordance with the present invention intended for packing six eggs;

Fig. 2 is a sectional view taken on the plane II—II of Fig. 1 on an exaggerated scale;

Fig. 3 is a sectional view taken in the plane III—III of Fig. 2;

Fig. 4 is a front view of the closed packing of the present invention;

Fig. 5 is a lateral view of the packing shown in Fig. 4;

Fig. 6 is a schematic diagram of an embodiment of the packing of the present invention in which three flasks are stored;

Fig. 7 is a schematic diagram of an embodiment of a fluted roller on which ready made corrugated paper may be provided with the strip-shaped parts having a smaller pitch; and

Fig. 8 is a sectional view of the roller of Fig. 7 taken in the plane VIII—VIII of Fig. 7.

The sheet of packing material shown in Fig. 1 is made

of corrugated paper, the corrugations 1 of which are parallel to the longitudinal direction of the tube to be formed. Since this packing is intended for six eggs, the corrugated inner side of the packing exhibits at six areas a strip-shaped part 2, the corrugations 3 of which (see Figs. 2 and 3) have a smaller height h from the smooth paper surface 4 than the corrugations 5 of the tube parts 6 lying on either side of the strip-shaped parts 2; the height of the corrugations 5 from the smooth paper surface being designated h_1 . Thus the head surfaces of the corrugations 5 having the height h_1 constitute supporting points for the object stored in the packing. The contact surfaces thus formed are shown in a front view in Fig. 2 and in a lateral view in Fig. 3. Fig. 3 shows, moreover, an object 7 stored in the packing; it is evident that due to the contact surfaces 5 this object is stored immovably in the direction of length P of the tube and due to the corrugations 3 having the height h it is supported elastically. Due to the pressure exerted by the object 7 on the head surfaces of the corrugations 5, these head surfaces are slightly bent over and, as is shown diagrammatically in Figs. 2 and 3, form a system 5a of slanting surfaces.

Fig. 4 is the front view of a closed tube. From the section between the lines AA and BB it is evident how the egg is supported along its largest dimension from the corrugations 3 having the smallest height. From the other part of the periphery the peaks of the corrugations 5 of greater height thus project and engage the largest sectional area of the egg. The packing shown in Fig. 5 is closed by superposing one of the tongues 8 or 9 on the other in a manner such that the egg is engaged intimately, and that the inner side of the tongue 8 engages the outer side of the tongue 9. The tongues 8 and 9, which are shown in the exploded view of Fig. 1, are formed by means of cuts or slits 10 and 11 in the material. In order to suppress the elasticity of the folded edge, the corrugations of the zone C of the tongue 8 are flattened towards the edge of the packing. It would also be sufficient to provide cuts only in one of the closing edges.

It is known that eggs are sorted and sold by weight; this does not mean that eggs having the same weight have the same external dimensions; differences in length of 15 to 20% are frequent. However, the cuts 10 and 11 in the starting material of the packing permit the rigid packing of each of the eggs of different lengths in one and the same packing; each set of the associated tongues 8 and 9 may be pressed so as to engage intimately the egg concerned. This is evident from the lateral view of the packing shown in Fig. 5; the sections b contain eggs which are longer than the eggs contained in the sections a . The aforesaid egg packing has another advantage in that the use of corrugated paper guarantees an excellent ventilation. In order to facilitate opening of the packing, a string may be stuck in one of the corrugations, this string projecting at one end from the tube and extending throughout the length of the tube.

The embodiment of the packing shown in Fig. 6 contains three identical flasks 16. In this packing, the starting material has corrugations of a height k in the strip-shaped parts 17, this height being smaller than the height k_1 of the corrugations of the other strip-shaped parts 12 of the packing. In this packing, the more or less abrupt transition between the bottom portion 13 or the top surface 14 and the cylindrical part 15 of each flask is utilized to adapt thereto the length of the strip-shaped parts 17. Furthermore, in this case, cheap packing material provides an extremely efficient packing, in which the stored flasks are held immovably. Both in the packing shown in Fig. 4 and in that shown in Fig. 6 the packing material may, if desired, be cut between two stored objects, one object being thus severed in the packing from the other, while nevertheless all objects remain in place in the associated packing material.

From Fig. 2 it is particularly evident that for the packing material according to the invention corrugated material of which the corrugations of the strip-shaped parts have only a smaller height and not a smaller pitch than the other parts of the material, may suffice.

The roller shown in Figs. 7 and 8 has ribs 20 extending throughout its length and having a pitch m , which is equal to the pitch of the uniformly corrugated material to be fed to said roller. At six areas distributed over the length of the roller, between each pair of teeth of the corrugation 20, in the grooves 21, provision is made of knives 22 in a manner such that a corrugation having half the pitch of the corrugation of the other roller portion is produced at six areas 23 throughout the periphery of the roller. When the corrugated paper is supplied to the roller, the strip-shaped parts of smaller pitch are formed at the area of the zones 23.

While the invention has been described by means of a specific example and in a specific embodiment, I do not wish to be limited thereby, for obvious modifications will occur to those skilled in the art without departing from the spirit and scope of the invention.

What is claimed is:

1. A packing tube of a given longitudinal dimension for containing spaced fragile objects comprising a rolled corrugated sheet, a rolled smooth sheet having a reference surface contacting said corrugations, the corrugations in said sheet being substantially parallel with said longitudinal dimension and having a given maximum height measured from said reference surface and a given pitch dimension, the corrugations being rolled on the inner surface of said tube and each corrugation having indentations at selected areas thereon to form a strip-shaped indented part, each of said strip-shaped parts being located in a direction substantially transverse to said longitudinal dimension and forming a compressible contacting rim on the inner surface of said tube, said indented parts including corrugations having over their entire length a smaller maximum constant height measured from said reference surface and a smaller pitch dimension than the corresponding maximum height and given pitch dimension respectively of the corrugations on either side of said strip-shaped indented parts.

2. A packing tube as claimed in claim 1 in which the smallest dimension across said co-acting contacting rims is less than the dimension of the object contained in said tube.

3. A packing tube for containing spaced fragile objects of different shapes, said tube having a given longitudinal dimension comprising a rolled corrugated sheet, a rolled smooth sheet having a reference surface contacting said corrugations, said sheets having surfaces adjacent opposite edges thereof in overlapping engagement with one another, the corrugations and said edges in the sheet being substantially parallel with said longitudinal dimension, said corrugations being rolled on the inner surface of said tube and having a given pitch dimension and a given maximum height measured from said reference surface, each of said corrugations on the inner surface of said tube having indentations at selected areas thereon to form a strip-shaped indented part, each of said strip-shaped parts being located in a spaced relation to another of said parts in a direction transverse to said longitudinal dimension and forming a compressible contacting rim on the inner surface of said tube, said indented parts including corrugations having over their entire length a smaller maximum constant height measured from said reference surface and a smaller pitch dimension than the corresponding maximum height and given pitch dimension of said corrugations on either side of the strip-shaped indented parts, and at least one of said edges having slits therein extending substantially transversely to said longitudinal dimension between said spaced objects to form adjustable closure means for containing objects of different shape.

5

4. A packing tube for containing spaced fragile objects of different shapes as claimed in claim 3 in which said strip-shaped indented parts are spaced in said longitudinal direction and having corrugations of smaller height alternating with corrugations of greater height.

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