

PATENT SPECIFICATION

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(54) MATERIAL AND PACK FOR PACKAGING FRAGILE ARTICLES

(71) I, TONI CASUTT, a Swiss Citizen of 45 Kirchweg, 8102 Oberengstringen, Switzerland, do hereby declare this invention, for which I pray that a Patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a packing material and pack for fragile articles, and also to a method for the manufacture thereof.

The packing material is of particular application to the packaging of eggs, but is not restricted to such articles.

Numerous packs or packing materials for fragile articles, in particular for eggs, are already known. Disadvantages with these is the fact that, for the most part, they require complicated machines for their manufacture, they require relatively expensive materials, in the empty state they take up very much space, or they insufficiently protect the articles carried thereby.

With the invention the problem of providing a packing material and a pack for fragile articles is solved, the packing material being inexpensive and simple to manufacture, and satisfactorily protecting articles packed therein.

The packing material according to the invention is characterised by a plurality of parallel supporting webs which extend in side-by-side disposition in the longitudinal direction of the packing material and each of which comprises a corrugated band and a strip-like covering band secured together in overlying relationship, the covering bands being intended for disposition on the outside of the packing when in use, the supporting webs connecting with one another only at positions remote from the covering bands on the tops of the corrugations to define fold lines extending parallel to each other whereby the supporting webs are capable of being

placed around the articles to be packed by bending along the said fold lines, the wavelength of the corrugations of the corrugated band being adapted to determine the pitch distance of the articles to be packed.

Such a packing material has the advantage that it is capable of being manufactured relatively simply and in bulk, with a minimum of expenditure of material. The material flexibly supports the packed articles and thereby gives a satisfactory protection against breakage. A further advantageous feature consists in that there is visual control from outside and the air has admittance to the packed articles which specially with eggs is important. Furthermore, the erected pack is capable of being stacked satisfactorily as it is bounded on the outside by plane surfaces.

The method of packing fragile articles according to the invention is characterised in that a strip-like covering band and a corrugated band are connected together in overlying, parallel relationship, a plurality of parallel, longitudinally extending, transversely spaced slits is made in the covering band and in the corrugated band, the slits completely separating the covering band but terminating below the tops of the corrugations, which tops comprise those parts of the corrugations remote from the covering band so that several parallel supporting webs connecting with one another result, after which the articles to be packed are inserted in the troughs of the corrugations and then the supporting webs are bent at the corrugation tops along parallel fold lines which correspond to and are defined by the slits and extend in the longitudinal direction of the band and about the articles to be packed.

With this latter method it is possible to manufacture such packing materials by simple machines from rolls of starting material and then immediately to pack the fragile articles.

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It is, however, also possible to manufacture the packings at one place and to supply them in the empty, flat state to a packing station, and thus according to another aspect of the invention there is provided a method of forming a packing material for fragile articles which comprises the steps of securing together a strip-like covering band and a corrugated band in overlying disposition and providing a plurality of transversely spaced slits longitudinally of the covering band and corrugated band to extend wholly through the covering band and to terminate short of those parts of the corrugations remote from the covering band, thereby to divide the material into a plurality of side-by-side webs formed together at such remote parts, the unslitted remote parts defining fold lines about which adjacent ones of the side-by-side webs which constitute the material can be folded to form a container for fragile articles, the wavelengths of the corrugations in the corrugated band corresponding to the pitch distance of the articles to be packed.

The invention will now be described further, by way of example only, with reference to the accompanying drawings, in which:—

Figure 1 shows a side elevation of a packing material in accordance with the invention;

Figure 2 is a plan view of the packing material as seen in the direction of arrow A of Figure 1;

Figure 3 is a section taken on line III—III of the packing material as shown in Figure 1;

Figure 4 is an end elevation of a partially assembled pack;

Figure 5 is a plan view of the partially erected pack of Figure 4 as seen in the direction of arrow E;

Figure 6 shows, in perspective view, the partially erected pack of Figures 4 and 5;

Figure 7 is a perspective view of the finished pack as used for the packaging of eggs;

Figure 8 is a diagrammatic perspective view of an alternative embodiment having corrugations capable of being flattened;

Figure 9 is an end elevation of a still further embodiment comprising a packing material for forming a double-row pack;

Figure 10 shows, in diagrammatic side elevation, a process for manufacturing the packing material and pack of the invention; and

Figure 11 is a diagrammatic plan view corresponding to Figure 10.

Referring now to the drawings, and particularly to Figures 1 to 3 thereof, a packing material 1 for the packaging of eggs, which packing material may,

however, serve also for the packaging of other fragile or pressure sensitive articles such as, for example, fruit or glassware, comprises two band-like parts, namely a corrugated band 2 and a flat covering band 3. Both bands 2 and 3 consist of cardboard of about 0.5 mm thickness and such bands may, if desired, be suitably resin, wax or otherwise coated. The corrugated band 2 is firmly connected to the covering band 3 at spaced flat areas 4 by means of adhesive. The angle α enclosed by the mutually inclined faces 19 of a corrugation is from 80° to 110° and preferably is equal to about 90°. The tops 5 of the corrugations are flat. The length t of each corrugation corresponds to the intended pitch at which the articles are to be packed and, in the case of eggs, amounts to between 4 and 5 cms and preferably about 4.5 cm. The length l of the corrugations is two to three times the height h of the corrugation, and is preferably about two and a half times such height. Cuts 6 are formed both in the corrugated band 2 and in the covering band 3, such cuts being parallel to one another and to the longitudinal direction B of the packing material and terminating short of the tops 5 of the corrugations. In the embodiment shown in Figure 2 there are, in all, four such cuts 6, thus to give, in effect, five side-by-side supporting webs 7, 8, 9, 10 and 11, each having respective corrugations corresponding ones of which are connected to one another only at their tops. The middle supporting web 9 is twice as wide as the two outer supporting webs 7 and 11. The width of the middle supporting web 9 is approximately equal to twice the height h of the corrugation. In the flat state of the packing material the articles to be packaged, for example, six eggs arranged in side-by-side disposition, are pushed into respective troughs of the corrugations 15 in the direction of the arrow D (Figure 2) until they lie approximately in the middle of the corrugated web 9. The supporting webs 7 and 8 on one side and the supporting webs 10 and 11 on the other side are then erected in that they are folded through 90° about lines of fold extending longitudinally of the material and defined by bend edges or fold lines 32 on the tops of the corrugations 5, so that the approximately U-shaped condition shown in Figures 4 to 6 results. Thus, the eggs 18 are surrounded on three sides by the supporting webs 8, 9, 10. In a further operation the two outermost supporting webs 7 and 11 are each folded inwards through 90° about respective fold lines 33 which fold lines similarly extend longitudinally of the material to give the pack as shown in Figure 7. The structure is maintained in its erected state with the eggs

positioned therein by means of adhesive strips 12 applied to the abutting supporting webs 7 and 11. The eggs 18 are now surrounded on all four sides by the supporting webs 7 to 11, but the nature of the pack is such that the surrounding air has access to the eggs, this being of importance for their storage and for keeping them fresh. In addition, it can readily be ascertained from outside whether, for example, an egg is broken. As is readily appreciated the erected pack is of generally rectangular form. As the inclined parts 19 of the corrugations 15 are somewhat resilient, and as the packed articles generally are supported by such inclined parts 19 rather than against the flat trough parts 4, the articles are cushioned against impacts. Furthermore, the resilience of the inclined parts does provide for the ready acceptance of articles of a variety of sizes in that the deformation of the inclined parts 19 will vary according to the size of the article concerned, so as to accommodate the same. In addition, the erected pack can take a reasonable amount of pressure, especially in stacking.

In Figure 8 an embodiment is shown in which the corrugations are collapsible to provide for the storage of the packing material in a flat state and for the transportation thereof in a space saving manner. To provide for the ready collapse of the corrugations, the tops 5 of such corrugations are formed with spaced parallel fold lines 36, 37, preferably defined by perforations, extending transversely of the packing. The fold lines 36, 37, facilitate the folding and collapsing of the corrugations, so that finally there remains only a thickness which corresponds to three times the thickness of the cardboard of the corrugation band 1 together with a single thickness of the covering band 2. The erection of the folded corrugations is effected by simultaneous insertion of mechanical fingers into the hollow spaces 39.

For fully collapsing the corrugations the following relations are to be satisfied:— twice the length s of the inclined part 19 of the corrugation minus the width r of the tops 5 has to correspond with the space k of the fold lines 17 at the base of the corrugations.

Figure 9 illustrates an embodiment comprising a double row pack, the middle strip being bent along a longitudinal fold line 17 in the covering part thereof along a line corresponding to such fold line 17. The band following slitting of the corrugations save for the innermost trough remaining construction of this packing material and the resultant pack corresponds in principle to that as

explained in connection with Figures 1 to 7, it being understood, however, that in the case of the embodiment of Figure 9 the eggs take up an upright position, in contradistinction to the construction of Figures 1 to 7 where they are lying down.

The method of manufacturing such packing materials as aforesaid and of erecting the same into a pack as shown in Figure 7 is illustrated in Figures 10 and 11. Thus, referring to Figures 10 and 11, material for the corrugated band 2 is drawn off from a roll 20 and is guided between two shaping wheels 21, 22, such wheels 21, 22 having cooperating tooth-like raised portions and recesses for forming a band guided therethrough to a corrugated shape. The material for the covering band 3 is provided as a roll 23 disposed beneath the roll 20 and is drawn from such roll over guide rollers 24, 25. Before the two bands are brought together, the corrugated band 2 is guided into contact with a glue applicator roller 27 partially immersed in a glue container 26 whereby adhesive is applied to the underside of the troughs of the corrugations. A plurality of pressure rollers 28 is provided above the corrugated band for ensuring contact of the band with the applicator roller 27, whilst a further plurality of pressure rollers 29 is provided for urging the corrugated band into contact with the covering band. The laminate formed as aforesaid is then guided past four circular knives 30, which form the longitudinal slits in the corrugated band and in the covering band to define the five parallel supporting bands 7 to 11, the knives being so positioned and dimensioned in relation to the corrugations as not to separate the tops 5 of the corresponding corrugations of the adjacent bands.

Eggs 18, or other articles to be packaged, are pushed either simultaneously or in succession, onto the packing material from the side, arrow D, into the troughs of the corrugations 15. A pusher 31 having fingers for engagement with the eggs is provided for this purpose. The supporting webs 8 and 10 are then folded, about fold lines 32, from the plane of the middle supporting web 9 by 90° to give the arrangement shown in Figure 6. For this, there are present stationary guide shoes 40 which effect lateral erecting of the supporting bands. In a subsequent operation, the support webs 7 and 11 are bent through a further 90°, from the planes of bands 8 and 10 respectively about fold lines 33, to give the final shape shown in Figure 7. Adhesive strips 12 are then placed over the abutting joints of the two longitudinal strips 13 and the packing is cut to the desired length. The whole manufacturing process may be effected step-by-step or continuously.

The material of the rolls 20, 23 may be previously printed or printing may be effected during the working procedure described.

- 5 The manufacture of the material for the double row pack of Figure 9 is effected in a similar manner, the differences being that the width of the material is greater than with the packing according to Figures 1 to 7 and there is, additionally, a fold line 17 whereat the material strip 16 is so bent as to give two parts arranged in adjacent back-to-back disposition and formed by slitting through the corrugations but not the covering band. On the underside there are additionally applied adhesive strips 38 in order to secure this packing in the position shown in Figure 9. The two strip-like parts 16 which lie in back-to-back disposition 20 may be glued together, if desired.

WHAT I CLAIM IS:—

1. A packing material for fragile articles, in particular eggs, characterised by a plurality of parallel supporting webs which extend in side-by-side disposition in the longitudinal direction of the packing material and each of which comprises a corrugated band and a strip-like covering band secured together in overlying relationship, the covering bands being intended for disposition on the outside of the packing when in use, the supporting webs connecting with one another only at positions remote from the covering bands on the tops of the corrugations to define fold lines extending parallel to each other whereby the supporting webs are capable of being placed around the articles to be packed by bending along the said fold lines, the wavelength of the corrugations of the corrugated band being adapted to determine the pitch distance of the articles to be packed.

2. A packing material according to claim 1, characterised in that it consists of cardboard.

3. A packing material according to claim 1 or 2, characterised in that five supporting webs are provided, the middle web thereof being twice as wide as each of the two outermost webs.

4. A packing material according to claim 3, characterised in that those supporting webs lying on either side of the middle web are of like width.

5. A packing material according to claim 1, characterised in that the number and respective widths of the various webs is so selected that upon being erected to form a pack the planes of the covering bands as seen in transverse cross-section define a rectangle.

6. A packing material according to any one of the preceding claims, characterised

in that the length of the corrugations is from two to three times, preferably about two and a half times, the height of the corrugation and in that the angle enclosed by the inclined faces of the corrugations is between 80° and 110°, preferably about 90°.

7. A packing material according to claim 1 characterised in that the middle web has a longitudinally extending fold line for forming a double row pack, the material at the two sides of the said fold line being intended to be in adjacent back-to-back disposition upon erection of the packing material to form a pack, and the corrugated band being slit longitudinally in register with such fold line.

8. A packing material according to any one of the preceding claims, characterised in that the tops of the corrugations are provided with two fold lines arranged parallel to one another and extending cross-wise to the longitudinal direction of the packing.

9. A packing material according to claim 8, characterised in that the corrugations are of truncated triangular cross-section wherein twice the length of the inclined part of the corrugation minus the width of the truncated tops thereof corresponds to the width of the base of the corrugations.

10. A pack erected from packing material as claimed in any one of the preceding claims.

11. A pack as claimed in claim 10, having an article or articles supported therein.

12. A method of packing fragile articles characterised in that a strip-like covering band and a corrugated band are connected together in overlying, parallel relationship, a plurality of parallel, longitudinally extending, transversely spaced slits is made in the covering band and in the corrugated band, the slits completely separating the covering band but terminating below the tops of the corrugations which tops comprise those parts of the corrugations remote from the covering band so that several parallel supporting webs connecting with one another result, after which the articles to be packed are inserted in the troughs of the corrugations and then the supporting webs are bent at the corrugation tops along parallel fold lines which correspond to and are defined by the slits and extend in the longitudinal direction of the band and about the articles to be packed.

13. A method according to claim 12, characterised in that the articles to be packed are introduced in the troughs of the corrugations in a direction parallel to the axes of the troughs.

14. A method according to claim 12 or 13, characterised in that the bands from which the covering band and the

The material of the rolls 20, 23 may be previously printed or printing may be effected during the working procedure described.

- 5 The manufacture of the material for the double row pack of Figure 9 is effected in a similar manner, the differences being that the width of the material is greater than with the packing according to Figures 1 to 7
10 and there is, additionally, a fold line 17 whereat the material strip 16 is so bent as to give two parts arranged in adjacent back-to-back disposition and formed by slitting through the corrugations but not the covering band. On the underside there are additionally applied adhesive strips 38 in order to secure this packing in the position shown in Figure 9. The two strip-like parts 16 which lie in back-to-back disposition
15 may be glued together, if desired.
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WHAT I CLAIM IS:—

1. A packing material for fragile articles, in particular eggs, characterised by a plurality of parallel supporting webs which extend in side-by-side disposition in the longitudinal direction of the packing material and each of which comprises a corrugated band and a strip-like covering band secured together in overlying relationship, the covering bands being intended for disposition on the outside of the packing when in use, the supporting webs connecting with one another only at positions remote from the covering bands on the tops of the corrugations to define fold lines extending parallel to each other whereby the supporting webs are capable of being placed around the articles to be packed by bending along the said fold lines, the wavelength of the corrugations of the corrugated band being adapted to determine the pitch distance of the articles to be packed.
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2. A packing material according to claim 1, characterised in that it consists of cardboard.
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3. A packing material according to claim 1 or 2, characterised in that five supporting webs are provided, the middle web thereof being twice as wide as each of the two outermost webs.
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4. A packing material according to claim 3, characterised in that those supporting webs lying on either side of the middle web are of like width.
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5. A packing material according to claim 1, characterised in that the number and respective widths of the various webs is so selected that upon being erected to form a pack the planes of the covering bands as seen in transverse cross-section define a rectangle.
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6. A packing material according to any one of the preceding claims, characterised

in that the length of the corrugations is from two to three times, preferably about two and a half times, the height of the corrugation and in that the angle enclosed by the inclined faces of the corrugations is between 80° and 110°, preferably about 90°.
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7. A packing material according to claim 1 characterised in that the middle web has a longitudinally extending fold line for forming a double row pack, the material at the two sides of the said fold line being intended to be in adjacent back-to-back disposition upon erection of the packing material to form a pack, and the corrugated band being slit longitudinally in register with such fold line.
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8. A packing material according to any one of the preceding claims, characterised in that the tops of the corrugations are provided with two fold lines arranged parallel to one another and extending cross-wise to the longitudinal direction of the packing.
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9. A packing material according to claim 8, characterised in that the corrugations are of truncated triangular cross-section wherein twice the length of the inclined part of the corrugation minus the width of the truncated tops thereof corresponds to the width of the base of the corrugations.
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10. A pack erected from packing material as claimed in any one of the preceding claims.
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11. A pack as claimed in claim 10, having an article or articles supported therein.

12. A method of packing fragile articles characterised in that a strip-like covering band and a corrugated band are connected together in overlying, parallel relationship, a plurality of parallel, longitudinally extending, transversely spaced slits is made in the covering band and in the corrugated band, the slits completely separating the covering band but terminating below the tops of the corrugations which tops comprise those parts of the corrugations remote from the covering band so that several parallel supporting webs connecting with one another result, after which the articles to be packed are inserted in the troughs of the corrugations and then the supporting webs are bent at the corrugation tops along parallel fold lines which correspond to and are defined by the slits and extend in the longitudinal direction of the band and about the articles to be packed.
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13. A method according to claim 12, characterised in that the articles to be packed are introduced in the troughs of the corrugations in a direction parallel to the axes of the troughs.
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14. A method according to claim 12 or 13, characterised in that the bands from which the covering band and the





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corrugated band are formed are taken from respective rolls of cardboard.

15. A method according to claim 12, characterised in that the top of each corrugation has spaced fold lines defined by lines of perforations extending transversely of the longitudinal direction of the material, to facilitate collapse of the corrugations against the covering band and in that the corrugations are adjusted to an erect condition before application of the articles to be packed thereto.

16. The method of forming a packing material for fragile articles which comprises the steps of securing together a strip-like covering band and a corrugated band in overlying disposition and providing a plurality of transversely spaced slits longitudinally of the covering band and corrugated band to extend wholly through the covering band and to terminate short of those parts of the corrugations remote from the covering band, thereby to divide the material into a plurality of side-by-side webs joined together at such remote parts, the unslitted remote part defining fold lines about which adjacent ones of the side-by-side webs can be folded to form a container for fragile articles, the wavelengths of the

corrugations in the corrugated band corresponding to the pitch distance to the articles to be packed.

17. The method as claimed in claim 16, wherein those parts of the corrugations remote from the covering band are each perforated along spaced parallel lines which extend transversely of the packing material, whereby the corrugations are collapsible against the covering band.

18. The packing material for fragile articles substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 7, Figure 8 or Figure 9 of the accompanying drawings.

19. A pack erected from packing material as claimed in claim 18.

20. The method of making a packing material and of packing fragile articles substantially as hereinbefore described with reference to and as illustrated in Figures 10 and 11 of the accompanying drawings.

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